FLIGHT, MARCH 21, 1935 FIRST AERO WEEKLY IN THE WORLD REGD. AT THE G.P.O AS A NEWSPAPE

# FLIGHT

The AIRCRAFT ENGINEER AND AIRSHIPS

No. 1369
Vol. XXVII

OFFICIAL ORGAN OF THE ROYAL AERO CLUB

SIXPENCE
EVERY THURSDAY

IGHER SPEEDS EASIER LANDING




The new 1935 PERCIVAL GULL is remarkable for ease in handling. With top speed of over 170 m.p.h. and cruising speed of over 150 m.p.h., all models are fitted, as standard and at no extra charge, with trailing edge flaps which reduce landing speed to no more than 43 m.p.h. The flaps are the result of exhaustive trials, and are now fitted to the majority of American high-performance aircraft.

The 1935 -seater PERCIVAL GULL offers a still further advance in comfort, fuel range and pay load. Full-sized doors each side of the cabin; separate luggage compartments, and an improved wing-folding arrangement, all make for the utmost convenience and handiness.

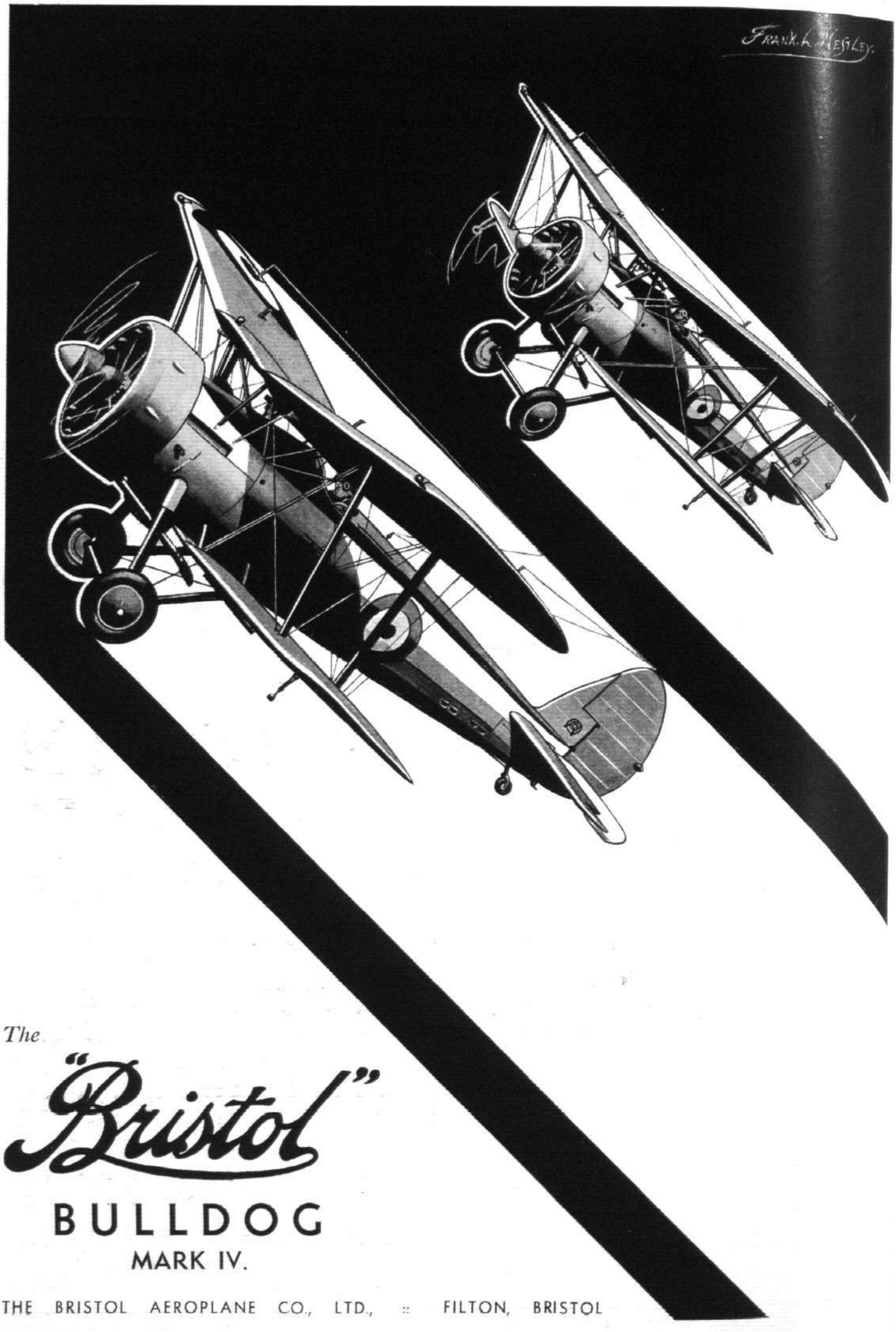
Prices, completely equipped:

With Gipsy Major Engine - £1,275
With Napier Javelin Engine - £1,475
With Gipsy Six Engine - - £1,575

Full specifications and other details furnished gladly, on request.

Percival Aircraft Co., 20 Grosvenor Place, London, S.W.1

935 PERCIVAL 'GULL'




*The*

# "Bristol"

## BULLDOG

### MARK IV.

THE BRISTOL AEROPLANE CO., LTD., :: FILTON, BRISTOL

# HANWORTH

THE LONDON AIR PARK FLYING CLUB LIMITED

(23 minutes Waterloo to Feltham Station, S.R., or by Piccadilly Tube to Hounslow, thence by bus)

Instruction on B2. Trainers, D.H. Moths, Avro Avians and Puss Moth, Monospar for Advanced Instruction.

| | |
|---|---|
| Entrance - - | £2 2 0 |
| Subscription - | 3 3 0 |
| Dual - - - | 2 5 0 |
| Solo, from - - | 1 15 0 |

Blind Flying, etc.

*Write for full particulars to the address below.*

**BLACKBURN B2**
**MONOSPAR**
**&**
**HENDY HECK**

*Sole Concessionaires:*

**AIRCRAFT EXCHANGE & MART LTD.**

**7, PARK LANE, LONDON, W.1**

Telephone: Grosvenor 3071.

**Also Aldenham, Guernsey, Denham, and Hall Caine Airport (I.O.M.).**



ALL AIRCRAFT
Flying under this Flag incorporate

# PARTS

supplied by

**Brown Brothers** Limited
AIRCRAFT ENGINEERS
GREAT EASTERN STREET
LONDON - - - E.C.2

# "FLIGHT" POSTCARDS

ACTUAL PHOTOGRAPHS

Machines of the

## R.F.C., R.N.A.S., and R.A.F.

Armstrong Whitworth "Atlas"
Armstrong Whitworth "Siskin"
Avro "Bison"
Avro 504K
Avro "Lynx"
Avro "Tutor"
B.E. 2C
B.E. 12
Blackburn "Baffin"
Blackburn "Dart"
Blackburn "Iris III"
Blackburn "Iris V"
Blackburn "Kangaroo"
Blackburn "Perth"
Blackburn "Ripon"
Boulton & Paul "Sidestrand"
Bristol "Bulldog"
Bristol "Fighter"
Bristol "Scout"
De Havilland D.H.1
De Havilland D.H.2
De Havilland D.H.4
De Havilland D.H.5
De Havilland D.H.6
De Havilland D.H.9
De Havilland D.H.9a
De Havilland "Tiger Moth"
Fairey III-D
Fairey III-F
Fairey "III-F" Seaplane
Fairey "Flycatcher"
Fairey "Fox"
Fairey "Gordon"
Fairey Long Range Monoplane
Fairey "Seal"
F.E.2-B
Flying Boat F.3
Flying Boat F.5
Gloster "Gamecock"
Gloster "Gauntlet"
Gloster "Grebe"
Handley Page "Heyford"
Handley Page "Hinaidi"
Handley Page "Hyderabad"
Handley Page 0/400
Hawker "Audax"
Hawker "Demon"
Hawker "Fury"
Hawker "Hart"
Hawker "Horsley"
Hawker "Torpedo Horsley"
Hawker "Nimrod"
Hawker "Osprey"
Hawker "Tomtit"
Hawker "Woodcock"
Henry Farman
Martinsyde F.1
Martinsyde F.3
Martinsyde F.4
Maurice Farman "Longhorn"
Maurice Farman "Shorthorn"
Nieuport 1½ 'Plane
R.E.8
S.E. V
Spad
Short 225
Short "Rangoon"
Short "R6/28"
Sopwith "Camel"
Sopwith "Dolphin"
Sopwith "Pup"
Sopwith "Salamander"
Sopwith "Snipe"
Sopwith 1½ Strutter
Vickers "Gun Bus"
Vickers "Vernon"
Vickers "Victoria"
Vickers "Vimy"
Vickers "Virginia"
Vickers "Vildebeeste"
Vickers-Supermarine S.6.B
Vickers-Supermarine "Scapa"
Vickers-Supermarine "Southampton"
Westland "Wallace"
Westland "Wapiti"

**Single Cards 6d. each, post free.**
**Six or more Cards 4d. each, post free.** } Cash with order.

**"FLIGHT" Office,**
**Dorset House, Stamford Street, S.E.1**
Telephone: Hop 3333.

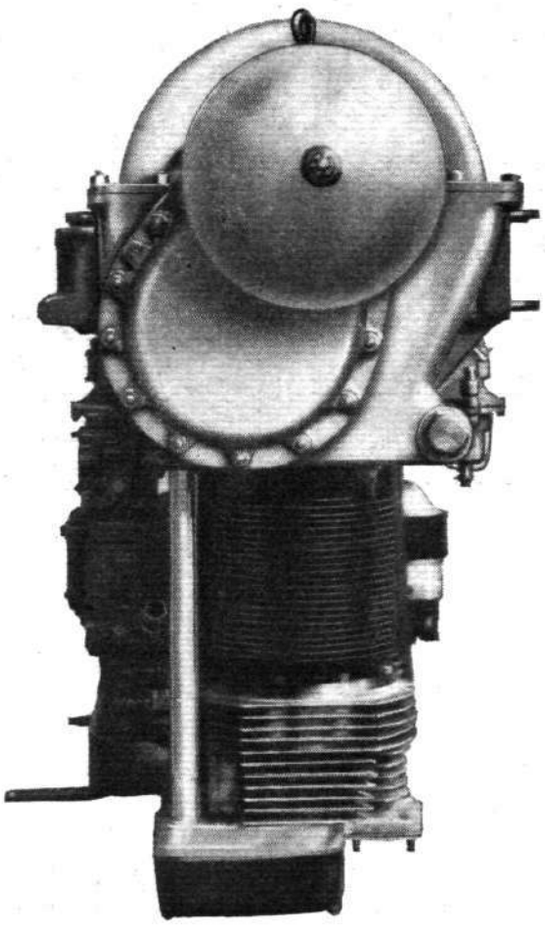
THE **IRVIN**
**AIR CHUTE**
IS THE **ONLY**
**PARACHUTE**
**APPROVED**
BY THE
**BRITISH AIR MINISTRY**
FOR USE IN THE
**ROYAL AIR FORCE**

**Irving Air Chute of Great Britain Ltd., Letchworth, Herts.**

*Phone:* Letchworth 370. *'Grams:* Irvin, Letchworth

The

# CIRRUS "MINOR"



**LOW FRONTAL AREA.**
**LOW INITIAL COST.**
**LOW RUNNING COST.**
**LOW TOTAL WEIGHT.**

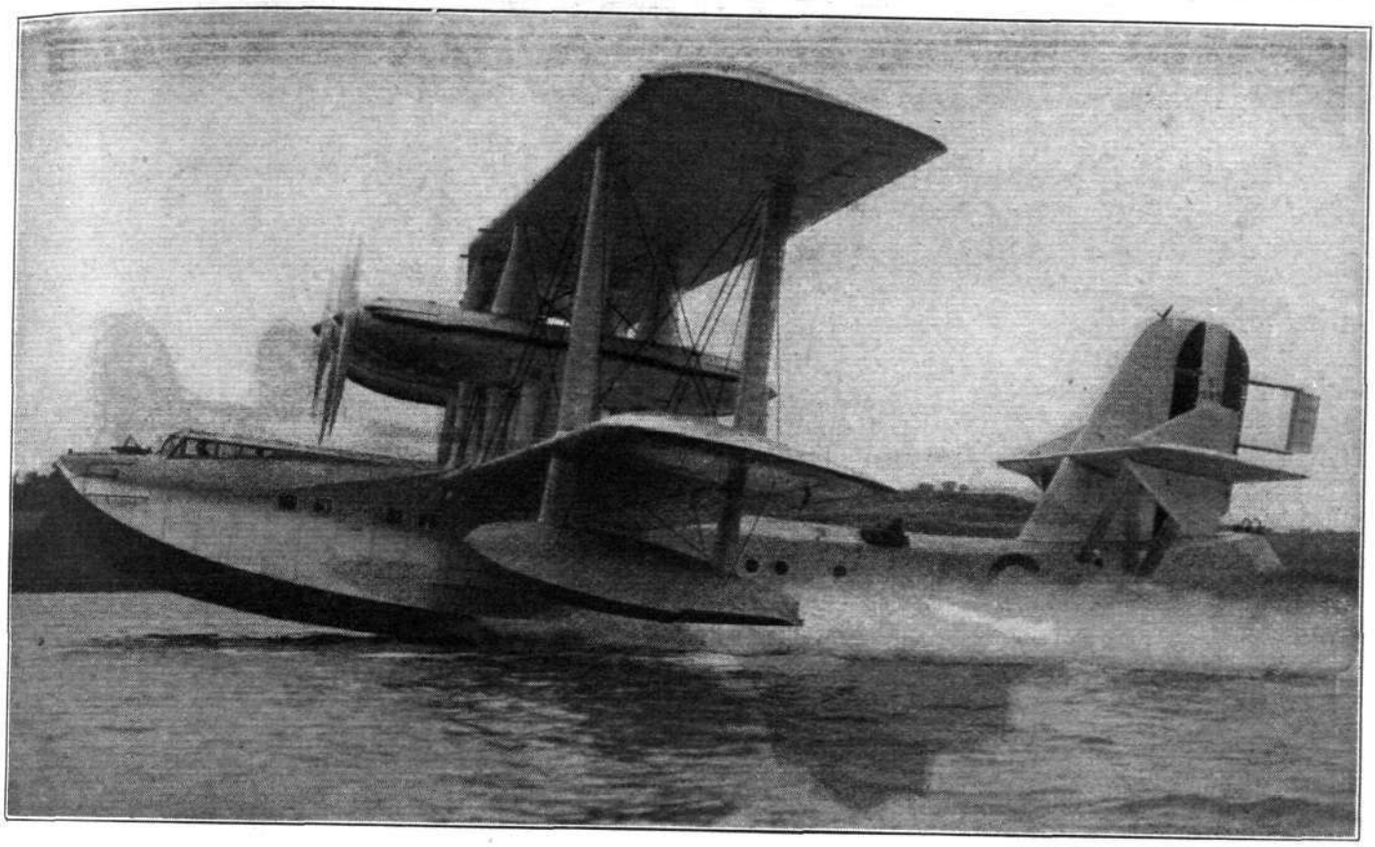
★

## SPECIFY A CIRRUS "MINOR"
for your new machine.

CIRRUS-HERMES ENG. CO., LTD.,
Brough, East Yorks.

Telephone:
Brough 121

Cables:
Ocirruso, Brough, Yorks.



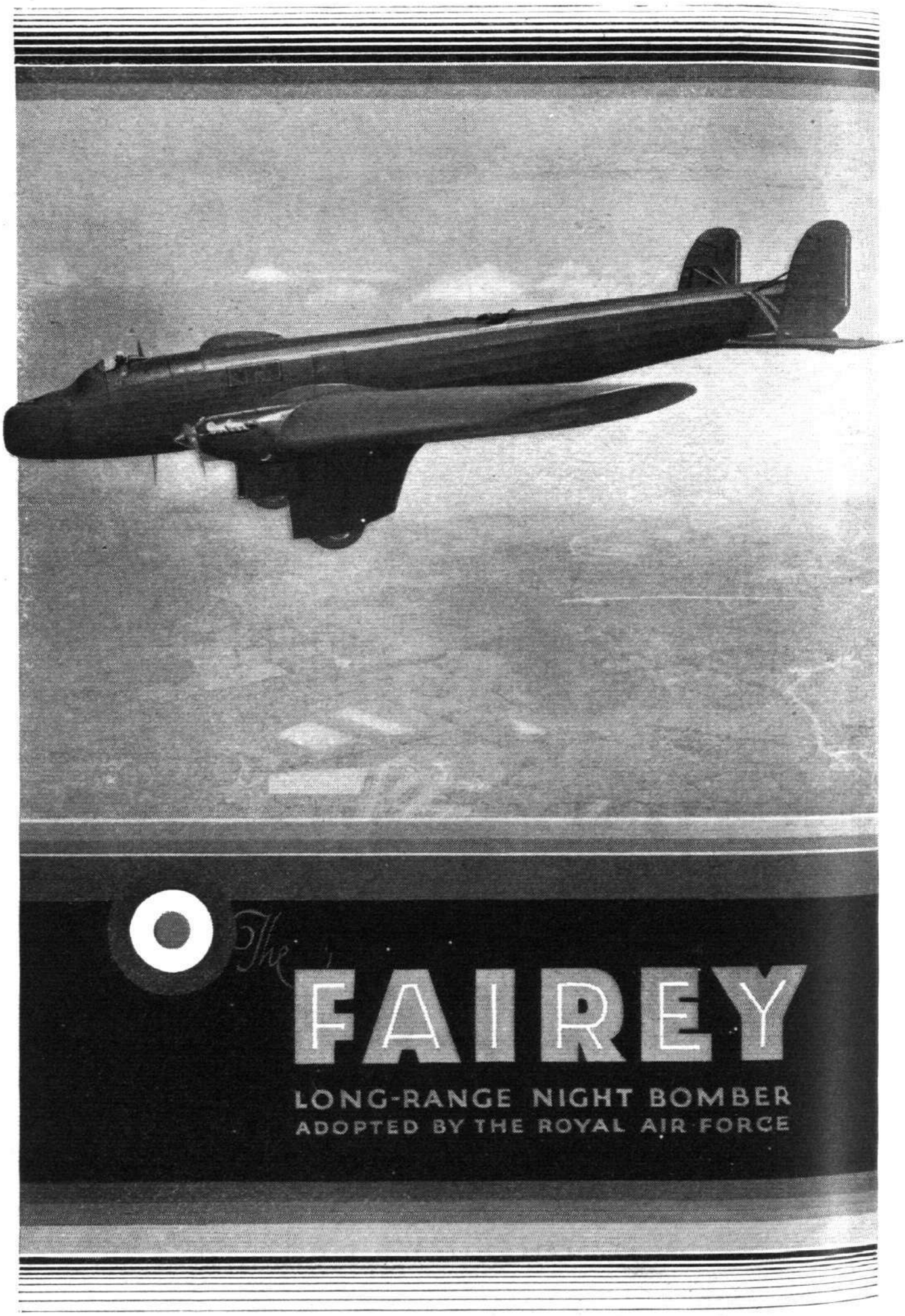
THE LARGEST FLYING-BOAT EVER
CONSTRUCTED IN ENGLAND
6 ROLLS-ROYCE ENGINES

# SHORT BROS.

AERONAUTICAL ENGINEERS

# ROCHESTER

LONDON OFFICE
41 WHITEHALL, S.W.1


The
FAIREY
LONG-RANGE NIGHT BOMBER
ADOPTED BY THE ROYAL AIR FORCE

FLIGHT
The AIRCRAFT ENGINEER AND AIRSHIPS
Founded in 1909
FIRST AERONAUTICAL WEEKLY IN THE WORLD
OFFICIAL ORGAN OF THE ROYAL AERO CLUB

No. 1369. Vol. XXVII. — MARCH 21, 1935 — Thursdays, Price 6d. By Post, 7½d.

Editorial, Advertising and Publishing Offices: DORSET HOUSE, STAMFORD STREET, LONDON, S.E.1
Telegrams: Truditur, Watloo, London. Telephone: Hop 3333 (50 lines).

| HERTFORD ST., COVENTRY. | GUILDHALL BUILDINGS, NAVIGATION ST., BIRMINGHAM, 2. | 260, DEANSGATE, MANCHESTER, 3. | 206B, RENFIELD ST., GLASGOW, C.2. |
|---|---|---|---|
| Telegrams: Autocar, Coventry. | Telegrams: Autopress, Birmingham. | Telegrams: Iliffe, Manchester. | Telegrams: Iliffe Glasgow |
| Telephone: Coventry 5210. | Telephone: Midland 2971. | Telephone: Blackfriars 4412. | Telephone: Central 4857. |

SUBSCRIPTION RATES: Home and Canada: Year, £1 13 0. 6 months, 16s. 6d. 3 months, 8s. 3d.
Other Countries: Year, £1 15 0. 6 months, 17s. 6d. 3 months, 8s. 9d.

# Rotating Wing Flight

EVER since man first began to dream of taking wings unto himself he has been faced with stern realities which prevented the realisation of his dream, or, at any rate, limited the degree to which it could be fulfilled. Langley, the Wright Brothers, Farman, Voisin, Bleriot and Roe, the forefathers of the aeroplane as we know it to-day, struggled on, and made possible the flight from one place to another at high speed.

But a fundamental obstacle in the way of their full success was the fact that their machines required large areas from which to start and to which to return, and, since orthodox aeroplanes of to-day follow the same fundamental principles, the obstacle still exists. Helicopter inventions have been many, but the direct-lift aircraft has proved a much more difficult subject than the indirect-lift type, in which engine power is first translated into horizontal airscrew thrust and then that thrust translated into lift *via* the mechanism of the wing. It was this reason which gave the aeroplane its long start over the helicopter, and not the fact that the aeroplane idea was easier to conceive. Actually, the direct-lift idea is a good deal more "obvious," but its technique is vastly more complicated.

Signs are not lacking that the rotary-wing type of aircraft is now, at long last, about to challenge the hitherto unassailable position of the aeroplane. As reported elsewhere in this issue, Señor de la Cierva disclosed in a lecture last Friday that by his latest "direct-start" rotor mechanism he has gone a long way towards achieving true helicopter performance. In this connection, incidentally, it should not be forgotten that similar results are achieved in the Kay Gyroplane, although the means adopted are different. Put quite briefly, and without technicalities, the whole secret lies, in both cases, in storing energy in the rotor blades by speeding them up to a rate in excess of that required for normal horizontal flight, and then using the energy thus stored for lifting the whole machine straight into the air, without any preliminary run along the ground.

The advantages of "direct-start" aircraft are obvious. As Mr. Wimperis, the Director of Scientific Research, pointed out at Señor de la Cierva's lecture, it is the first few inches which count. If no run is required is clearly matters little whether the ground is smooth or rough, soft or hard. That means that if a rotary-wing aircraft is forced to alight on ploughed land, in a cabbage patch, in long grass, or even in a cornfield, not only will it do little damage to the crop, but the machine can leave the spot again without having to be dismantled and transported away on a lorry. This is, in itself, an advantage which cannot well be exaggerated.

### *The Amphibian*

If one turns to the seaplane, and even more so to the amphibian, the future looks still more promising. Obviously, an amphibian rotary-wing aircraft is the ideal for literally going from anywhere to anywhere. No field or patch of ground, and no river or sheet of water is too small for the machine to alight on or start from—within reason. The tennis court or the suburban garden very nearly suffice, but not quite, because skill and judgment will still be needed for the approach to a landing in such restricted spaces. The Serpentine in Hyde Park and the Welsh Harp at Hendon would afford ample space, as would the Thames anywhere as far up as Windsor.

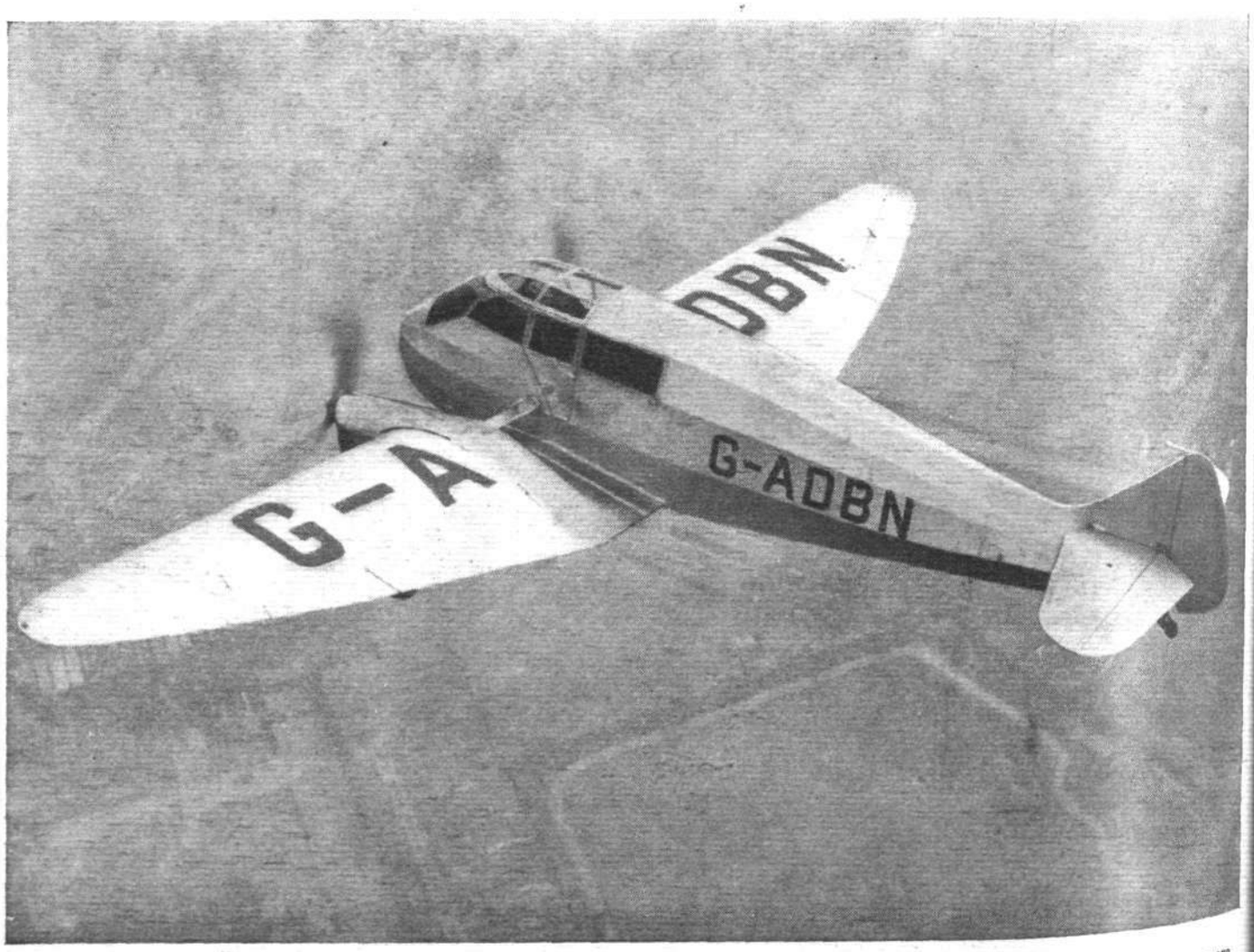
It is inevitable that the latest developments in Autogiro design should raise the question whether the helicopter still is an ideal worth striving for. Señor de la Cierva does not appear to think so, and he may well be forgiven for holding the view that he is about to achieve all that part of the helicopter performance which is really necessary. With his direct-start system he promises "hops" of 20 feet or so at once. This will

enable the Autogiro to get out of very restricted spaces indeed, even if surrounded by hedges and trees. Minimum speeds as low as 15 m.p.h. have been achieved by lightly-loaded Autogiros, and on most days of the year such a speed is sufficiently low to constitute stationary hovering over a given spot against the wind.

He would be a bold man who would dare to assert that there is no use in trying to go any farther. Conditions can easily be visualised in which sustained vertical ascent or descent would be not only desirable but a necessity: Ascent from a deep valley shut in on all sides by hills; climbing out of a back garden and getting clear of surrounding houses or tall trees; alighting in similar conditions; or flying in the circumstances of the nightmare conjured up by Flt. Lt. Comper in an article published this week, in which the machine finds itself on a foggy night over the Midlands. In this last instance the ability to descend vertically and quite slowly a few feet a minute would be extremely welcome. It may be argued that in such conditions no aeroplane would be out, owing to the risk of collision with other aircraft. But it should be remembered that by the time we have the helicopter in practical form there is cause for believing that we shall have efficient means of warning an aircraft of the presence, direction and distance of another in the vicinity.

The relative aerodynamic efficiency of the Autogiro and the helicopter is at present a matter for conjecture, but it may be that one will show superiority over the other. At least, it appears to us that there is sufficient cause for continuing the development of both. We do not believe that one will ultimately oust the other, nor that either will supplant the aeroplane as we know it to-day; rather do we take the view that rotary-wing aircraft are supplementary to the aeroplane. There is room enough for all, and the future looks extremely bright.

For the present, the rotary-wing type of aircraft is not cheap, in spite of statements published in the lay Press from time to time about "the car of the air" costing a couple of hundred pounds which is said to be imminent. The rotor mechanism is of necessity somewhat complicated compared with the very simple wings of an aeroplane. This is not to say that this class of aircraft will always be expensive. In point of fact, the mechanism of a rotor head is not unlike that of a motor car transmission. If built "by hand" in twos and threes it is obviously expensive, but when a certain degree of stability in design has been reached, so that standardisation becomes practical, there is no reason why rotor mechanism should be very much more costly to produce in large quantities than is the transmission of a motor car. When batches of several hundred can be put down, the cost will soon come down also. That day appears to be quite close at hand. The enormously extended use made possible by the new direct-start system, coupled with a fall in prices, will bring about a vast increase in the popularity of flying.




**FOR AUSTRALIA: Last week the first pair of a series of Monospar machines ordered by an Australian company were "christened" at Hanworth. This photograph, taken by a *Flight* photographer, shows the S.T.12, one of the types on order, from an angle which clearly illustrates the characteristic wing-form. A photograph of the ceremony appears on page 376.**

# The Outlook

## A Running Commentary on Air Topics

### What of the Air Pact?

IT is satisfactory to know that, after all, Sir John Simon is to visit Berlin and discuss the proposed air pact. The announcement that Germany had openly avowed her re-armament on land and in the air had seemed to threaten the prospects of that pact. It will be remembered that the inducement offered to Germany to join with France, Belgium and Britain in this pact of mutual air guarantee was that the clauses of the Treaty of Versailles which limited German forces should be supplanted. Of course, everyone knew that Germany had been re-arming secretly in defiance of the Treaty, but there is a great difference between legitimate arming and open defiance of "scraps of paper."

The problem has been to remove one sense of grievance by restoring Germany to equality of status with other Powers, while at the same time averting the nervousness which German re-armament caused in France. The air pact seemed likely to achieve both objects. Now, not unnaturally, grave misgivings have been aroused in France.

Even though Germany has reiterated her invitation to the British Foreign Secretary to visit Herr Hitler, the prospects of an amicable agreement between Britain, France, Belgium and Germany now seem much less glowing than they were a few days ago. We must hope that the diplomatic powers of Sir John Simon and Mr. Eden will yet find a way out of the difficulty, for otherwise the situation is, to say the least of it, disquieting.

### Air Defence

THE Army Estimates include a sum of over £450,000 for improving the anti-aircraft defences of the country during the coming year. Practically the whole of the money is required for material, such as searchlights, anti-aircraft guns, sound locators, instruments for directing fire, and appropriate ammunition.

In introducing the Estimates, Mr. Hacking, Financial Secretary to the War Office, said that during this year it was proposed to complete the air defences of London but that the radius of aircraft had been so extended that they must also provide for the defence of the industrial areas in the North and Midlands. The War Office was faced with this "serious extra commitment" for the next few years at least, and he added that this was the case, "especially in view of yesterday's news"—obviously referring to the news of Germany's decision to re-arm openly. Certain Territorial field units in the London area had therefore been asked to consent to be transformed into air defence units. Nothing was being done this year with regard to the air defence of the North and the Midlands. It would be a considerable time before any decision could be reached, and still longer before any plans could become operative.

It is very satisfactory to know that the War Office is now to take the matter of air defence very seriously, though we still hold that the better arrangement would be to entrust the whole of this question to the Air Ministry. At any rate, if the War Office is inclined to bemoan the expenditure on air defence, it might remember that the cost of the five army co-operation squadrons and the R.A.F. School of Army Co-operation is always included in the Air Estimates, with no appropriation-in-aid from War Office funds.

### Control Simplification

THE somewhat belated enthusiasm for the Mignet *Pou-du-Ciel*—the design was described in *Flight* as long ago as September 20, 1934—has brought in its train the ageless question of control simplification and its possibilities. In "The Outlook" of March 7 we remarked that at least two designers had come to the conclusion that a machine should not need a rudder for normal manœuvres.

Everyone admits that the rudder bar is a rather unsatisfactory control, and that the novice generally has more trouble with it than with either of the others. Nevertheless, the rudder is vitally essential so long as the present trend of design is followed, and so long as the elevator is powerful enough to bring a machine to the fully stalled attitude.

Surely, if it is insisted that simplification is desirable, it would be more logical to design machines so that the ailerons are unnecessary, and to use the stick, as in the case of the *Pou-du-Ciel*, to operate the rudder? The instinctive use of the column against a dropping wing would then be almost equally effective at normal speeds and might be a great deal more effective near the stall.

### The Essential Rudder

SOME weeks ago a member of the Staff, by way of settling some little problems for his own interest, attempted to fly a particular training biplane on the rudder alone. At cruising and maximum speeds the wing-lifting reactions of "opposite rudder" were comparatively slow, but at and near the stall a falling wing came up at once after rudder application, whereas, with the instinctive stick movement, the machine was merely precipitated into a spin. In other words, the natural reaction was a dangerous one, and only the "taught" rudder movements would keep the machine on a level keel. The moral, in this case, appears obvious enough in all conscience—with a stalled machine of this type the best of pilots might make an instinctive and fatal aileron correction.

Of course, pedal control for the rudder has its advantages, and a machine which will turn and come out of a turn by use of the rudder alone can be very comfortable on a long trip.

One of the many good points of the now obsolete Desoutter, for instance, was that the pilot could spread a map or read a book on the bumpiest of days. Furthermore, this machine could be taken off, turned and straightened out again "hands off."

### A "Pou Club"

CO-ORDINATION is needed if the interest shown in the *Pou-du-Ciel* is to result in progress along sound lines. Totally unrestricted building and flying of this interesting little machine may, unless it is accompanied by the exercise of a good deal of common sense, lead to trouble. For a start, it is by no means certain that the Airworthiness Department of the British Air Ministry will pass the design as it stands; in fact, it will almost certainly not. If modifications are to be carried out it is essential that they should be designed by someone with a thorough knowledge of the subject.

But even if the design is passed, there still remains the

question of materials and workmanship. It is very advisable that someone should be at hand who can advise on such matters. We do not feel that the Air Ministry should insist on the same official inspection of materials, etc., as that which more orthodox aircraft have to bear. The cost would become too high, for one thing. Rather do we feel that a special class should be formed for the *Pou-du-Ciel*, subject to the materials being passed by someone capable of doing so. We therefore welcome the letter from Air Commodore Chamier, Secretary-General of the Air League of the British Empire, published in our Correspondence columns this week, pointing out that a "Pou Club" has been formed by the League. The club should do much to ensure that the "new flying" gets a fair start.

## *High-speed Cruising—*

*RAISING* the cruising speed of commercial aeroplanes is not only fraught with difficulties brought about by the increased cost of operation, but it also engenders other problems, which in some cases appear to have been overlooked.

Take, in the first place, the question of passenger comfort. The higher the cruising speed the more are bumps felt during rough weather. The days are gone when passengers would put up with being thrown and blown about just for the satisfaction of travelling in the air and at high speed. Now they demand comfort, and, as they generally pay highly for this class of travel, they have a right to receive it.

Imperial Airways have always made a point of flying high whenever the weather was bad in order that their passengers might not be inconvenienced by the bumps nearer the ground. In future, when the cruising speed of their machines is raised—as it is being—their pilots will also have to cruise at lower speeds when the conditions demand it; that will mean allowing a wider schedule latitude . . . and the unfortunate operations manager gets caught in another vicious circle!

## *—And Safety*

*EVENTS* in various parts of the world during the past year or two also point to the fact that several accidents have occurred through structural failures caused by pushing aeroplanes through very bad weather at high speed. Obviously, the higher the speed through a "bump"—that is, a gust approaching the vertical in either direction—the greater the increase of stress in the structure due to that bump, and, therefore, the greater the margin of strength required for safety. It cannot be left entirely to the judgment of the pilot when to decrease speed, although that is, in effect, what happens at sea. In the air bumps cannot be seen, although the general conditions may suggest that they are likely to be encountered, and, therefore, the latest recommendation of the I.C.A.N. on the subject of increased load factors may have to be considered very carefully indeed if we are to avoid more of those accidents wherein there is every probability of structural failure having occurred—though the fact is almost impossible to prove.

## *Foundation and Finish*

*WHEN* an interested crowd surrounds one of the few American cabin machines seen in this country, the conversation usually appears to turn to the question of finish. Certainly, with the assistance of a score of separate coats, each carefully rubbed down, the finish of a few American private types is something to admire. There is nothing miraculous about it, and several types in this country are turned out with a gloss that is almost, if not quite, as marked.

Nevertheless, a very great deal depends on the surface to be treated, and it is difficult to make a ply-covered wing or fuselage so perfectly that a good finish will not bring slight irregularities to light. Such irregularities cannot be considered as faults, and are slight enough to pass unnoticed with the more usual aircraft finish. From the maintenance point of view, incidentally, surface perfection can even be a considerable nuisance.

Even a pluperfect exterior finish can be marred, too, by comparatively primitive internal fittings. One feels that, if the well-provided business man is to be led by the hand into private ownership, the U.S. manufacturers are on the right lines in attempting to make the cabin, control, and dashboard arrangements of a £2,000 aeroplane at least as attractive as those of a £200 car.

## *Uniformity in Uniform*

*ALTHOUGH* there may be strong objections in some quarters to the wearing of uniforms by all air-line personnel, there seems to be little doubt that smart uniforms have the right effect on both actual and prospective air travellers. If there is any obvious reason for objecting to a commercial pilot flying in a sports shirt and oily flannel trousers, then there is an equally obvious reason why traffic managers, booking clerks, and any members of the air line staff who appear officially in public should be neatly attired.

The effect is a purely psychological one, but it is, nevertheless, important. Ordinary persons are impressed by the *appearance* of efficiency and standardisation that a uniform gives, and, for some curious reason, a smart uniform does definitely increase the efficiency of the average person. Meanwhile, tailors have seen to it that air-line uniforms are tolerably uniform. Let us hope that no enterprising operator will ordain that his staff shall be turned out in some sky-blue shade or other. The Mercantile Marine effect is both smart and practical.

## *Lighting Airways*

*AIRWAY* and aerodrome lighting is a science; not yet an exact science by any means, but nevertheless a science about which few people know very much. The ordinary pilot knows that floodlights, boundary lights, airway beacons, and obstruction lights are used, and that some are good and some not so good; but, generally speaking, he does not know the whys and wherefores of the different types.

The subject is one of great complexity upon which there cannot yet be any unanimity of opinion, because the needs of aviation are changing from day to day. In a paper read before the Illuminating Society last week Mr. H. N. Green very effectively correlated most of what is known of the subject, and his paper should become one of the standard works of reference for some time to come. He sums up the position by saying, " . . . further progress primarily depends on the attainment of a clearer understanding of what the various lights should do and how they are used."

**MODERN AIRPORTS**

The issue of *Flight* for April 4 will be a special Airports Number, dealing very fully with modern airport equipment, construction and organisation, both at home and abroad

THURSDAY FLIGHT APRIL 4

# NEXT to NOTHING

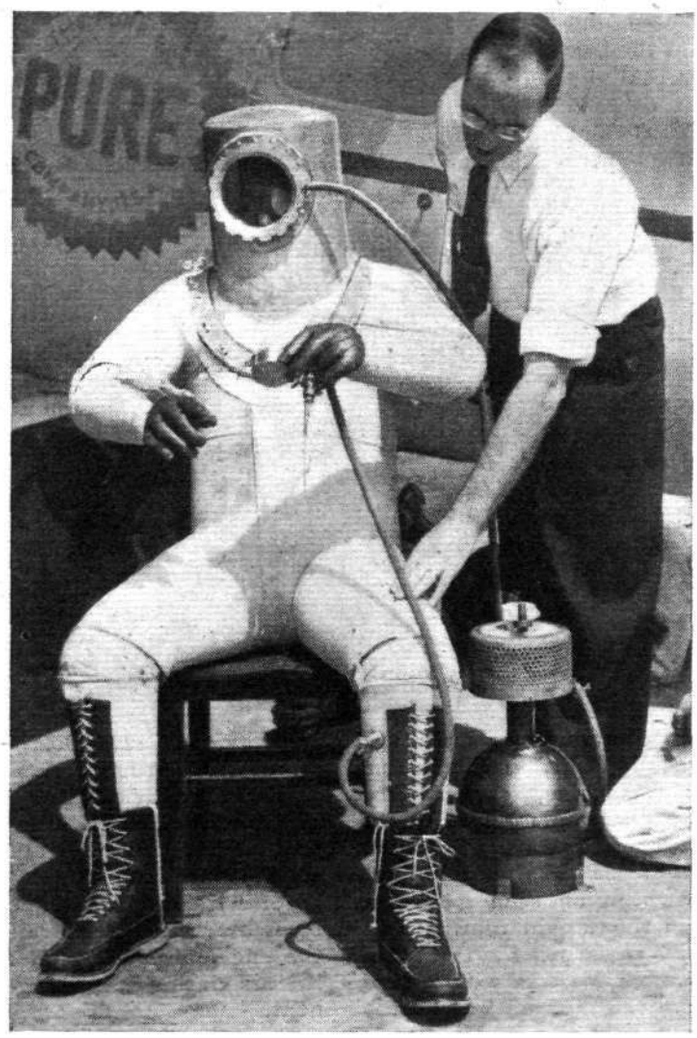
*Some Thoughts on a Topical Subject—the Conquest of the Stratosphere : Weighing-up the Advantages and Disadvantages of Flying in Thin Air : the Human Aspect*

HIGH-ALTITUDE flying is a subject on which opinions differ considerably. Flying in the less dense air offers opportunities in the way of increased speed for little or no increase in power; some hold the view that these advantages are so considerable that it is logical to suppose that the long-distance routes of the future will follow the "wide open spaces" above the clouds. Others consider the technical and physical difficulties so great as to outweigh the advantages which might be gained. It is quite impossible to be dogmatic on the subject, and the best that can be done at present is to get a clear conception of the fundamental principles involved and bear them in mind when contemplating future developments.

The lower region of the earth's atmosphere is known as the *troposphere* and extends up to a height of about six miles, or 32,000ft. Clouds are rarely found beyond this height. The upper region of the atmosphere is known as the *stratosphere*, and is separated from the *troposphere* by a boundary region known as the *tropopause*.

It has long been known that the density and the pressure of the air decrease with altitude, and it is this fact which presents both the attractions and drawbacks of high-altitude flying. At a height of approximately 20,000ft. the density of the air is about one-half the density at ground level. That is to say, the weight of a cubic foot of air is about half that of a cubic foot of air at ground level. At slightly more than 40,000ft. the density is approximately one-quarter of the ground level density. In a similar manner the pressure decreases with height, being nearly 15lb./sq. in. at ground level, 6¾lb./sq. in. at 20,000ft., 2¾lb./sq. in. at 40,000ft., and just over 1lb./sq. in. at 60,000ft. The temperature also decreases with height, but reaches a limit at about 40,000ft., where it is approximately —70 deg. F., a value below which it does not appear to fall.

From the physical point of view, the low densities, pressures and temperatures are a serious hindrance, in that special precautions have to be taken to allow human beings to breathe and move in such conditions. The very low density at great heights makes it necessary for the occupants of an aircraft to carry special oxygen apparatus in order to compensate for the reduced quantity contained in every cubic foot of air drawn into the lungs. Electrical heating apparatus has to be carried to prevent numbness, and even to counteract freezing of the pilot's eyes.




**Wiley Post, the American pilot who has recently made several high-altitude flights, wearing his special suit which is supplied with air from one of the engine superchargers. The air is led to the helmet and exhausts *via* the boots**

Low pressure of the surrounding air also brings with it difficulties similar to those which confront a diver coming up from great depths. Experiments have been made with special suits of alternate layers of rubber and silk. For example, such a suit is worn by the American pilot Wiley Post, and it will be observed from the photograph on this page that he wears in addition a helmet not unlike that of a diver's suit. Air is led from one of the engine superchargers to the helmet, and is exhausted through the boots. An inlet is provided for emergency use, by which oxygen from a tank can be turned into the helmet.

The height to which a human being can ascend without suffering serious ill-effects varies with the individual. It will be recollected that a few years ago Mr. C. F. Uwins, Bristol's chief test pilot, established a world's altitude record in a Vickers "Vespa" biplane fitted with a Bristol "Pegasus" engine, reaching a corrected height of 43,976ft. Mr. Uwins was, of course, provided with an oxygen supply, and wore an electrically heated suit, gloves and helmet. He stated afterwards that he had suffered no ill-effects of any consequence. Last year an Italian pilot, Commandant R. Donati, reached a new height record of 47,352ft. in a Caproni monoplane, fitted with a 600 h.p. Bristol "Pegasus" engine. That may be taken to represent very nearly the maximum height which a human being can stand without some very special precautions, such as a special suit and helmet after the style of Wiley Post's, or enclosing the pilot in an airtight cabin supplied with oxygen either from the engine supercharger or from oxygen bottles. The supercharger would have also to supply the required pressure inside the cabin. This would not necessarily be ground level pressure, but it would have to be a good deal higher than the pressure of the surrounding air.

The two pilots mentioned were, of course, specially trained and were physically very fit. The average passenger in a commercial aeroplane would not be expected to stand such heights, and, in fact, it seems doubtful

whether a height above 8,000-10,000ft. will ever be commonly used unless air-tight cabins are introduced.

So much for the aspects of high-altitude flying which especially affect the occupants. When we turn to the technical side, some advantages and a good many difficulties are found.

It is a fundamental law of aerodynamics that the drag of an aeroplane varies as the square of the speed and inversely as the air density. On the face of it, therefore, one would say that, by going up to great heights, the drag of the aeroplane would be reduced, so that for the same power one could travel very much faster.




(Above) In this Farman monoplane, specially built for high-altitude attempts, the pilot flew for a time with his head outside the cockpit; then, when sufficient height was gained to make risk of collision with other aircraft improbable, he lowered himself in the cockpit and shut an airtight door above his head.




(Left) The Vickers "Vespa" biplane, with special supercharged Bristol "Pegasus" engine, on which Mr. C. F. Uwins gained the altitude record for Britain in 1932 with a height of 44,000 ft. The record is now held by a "Pegasus"-engined Caproni biplane with a figure of 47,353 ft.

Unfortunately, there are many factors which make the attainment of these higher speeds difficult. The first one is related to the engine. A petrol engine, as everybody knows, draws into its cylinders a certain mixture of air and petrol, the oxygen in the air enabling combustion to take place. Owing to the decrease in air density at heights, the weight of air drawn in on each induction stroke of the piston is less than the weight drawn in at ground level, although the volume is the same. To obtain a proper gas mixture it is, therefore, necessary to reduce the quantity of petrol, otherwise the mixture will be too rich. The cutting down of the amount of petrol admitted results at once in a fall in engine power, this fall being approximately proportional to the altitude. At 20,000ft., for example, where the density is roughly one-half the ground level density, the engine power will also be reduced to approximately one-half, and one's hopes of attaining the extra speed are doomed to failure unless means can be found for supplying extra oxygen to the engine.

Such means have been found in the supercharger, which is, basically, merely a centrifugal blower, driven by the engine and causing a raised pressure in the induction pipes of the engine. That, one would say, has solved the problem. But, unfortunately, it has brought with it some other difficulties. If the engine was originally designed for giving its full power at ground level when naturally aspirated, it will receive too large a charge of mixture when the supercharger is brought into action at a low height, and the engine may not be able to stand the extra strain. During the earlier stages of the climb, it may be necessary to put the supercharger out of action until a certain height has been reached. Then, when the supercharger is brought into use it will enable the engine to maintain its ground level power up to a height which depends upon the degree of supercharging. This height may be 5,000ft. or 15,000ft., according to the design. Whatever the altitude is, the effect is to make that height the equivalent of ground level as far as the engine is concerned, the power beginning to fall off from that altitude onwards, just as it previously did in the unsupercharged engine from ground level onwards.

It will be obvious that power is absorbed in driving the supercharger, so that here is an obvious limit to the gain that can be expected. For reaching heights much above 40,000ft. it is no longer practicable to get the necessary boost with one supercharger, and two or more in series must be used. This again means a considerable drain on the engine's power, and steps have to be taken to cool the air during its passage from one supercharger to the next.

When heights such as those contemplated are involved, the airscrew problems make themselves felt. An ordinary airscrew with fixed blades has its maximum efficiency at some particular value of forward speed, rotational speed and diameter. If the airscrew is designed to give good efficiency near the ground, at the speeds attained there, its efficiency will be poor at a great height and at a much increased forward speed of the aircraft. On the other hand, if the airscrew is designed for the altitude conditions, its efficiency at low altitudes will be poor, and the climb will suffer badly.

Two remedies are obviously possible. Either one can introduce a gear box, or one can design the airscrew so that the pitch angle of its blades can be varied. The latter alternative is the one which is coming into general use, a number of controllable-pitch airscrews now being available. Just as the supercharger restored the power of the engine at great heights, so the controllable-pitch airscrew restores the airscrew efficiency.

From the fundamental laws of aerodynamics it follows that, "other things being equal" as the mathematicians have it, the speed of an aeroplane should increase inversely as the square root of the air density. That is to say, at 20,000ft. the speed should be increased by about 42 per cent. and at 40,000ft. it should be nearly doubled. In practice this is not, of course, possible, not only because of the power absorbed in driving the engine but also for a number of other reasons. A very substantial gain is,

# WORLD'S LAND SPEED RECORD

*The*

# ROLLS-ROYCE

*aero engine*

*of*

## "BLUE BIRD"

*was fitted with*

# K·L·G

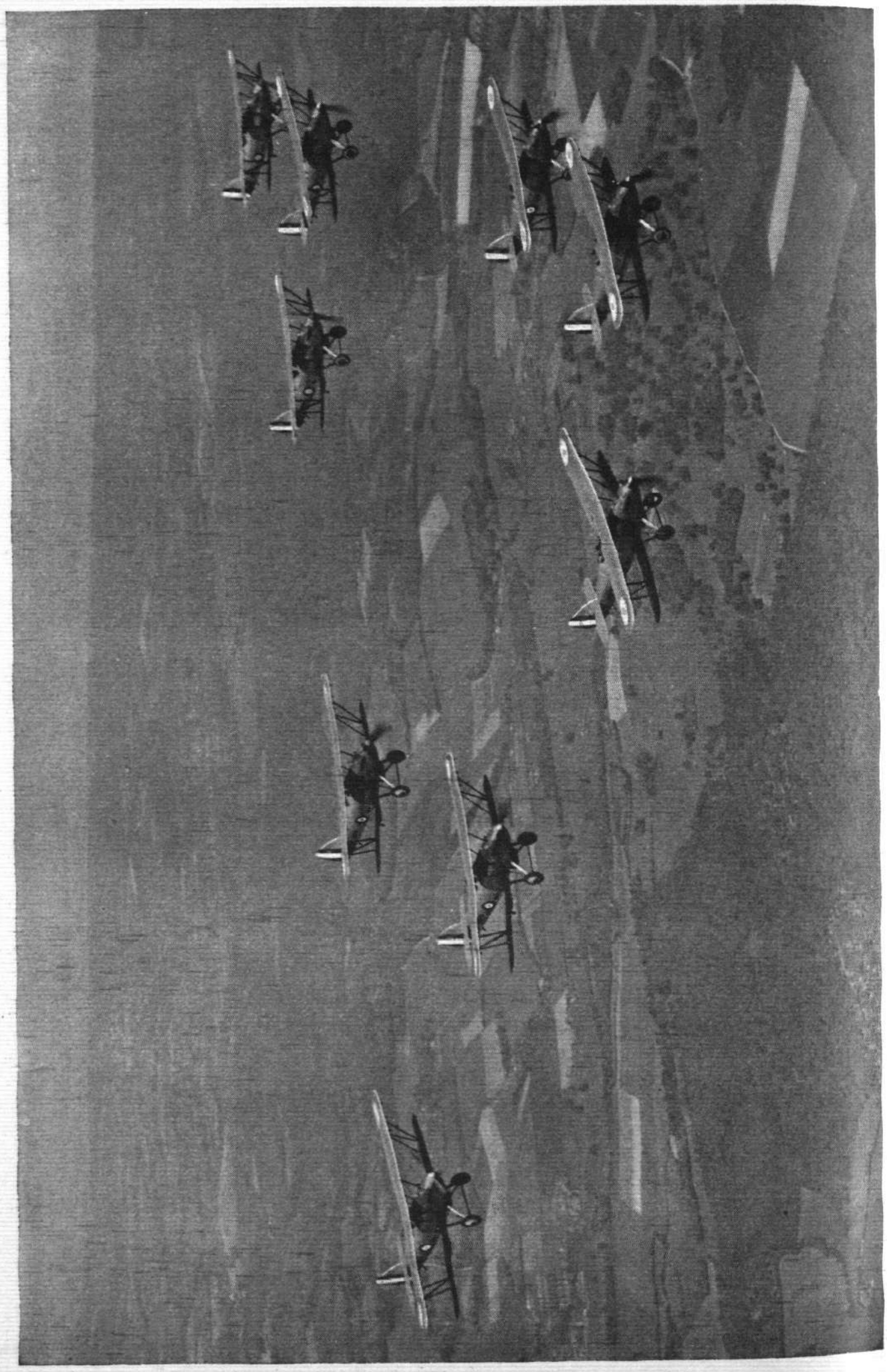
SPARKING PLUGS

Sir Malcolm Campbell cabled:

"K·L·G PLUGS HAVE AGAIN AFFORDED EVERY POSSIBLE SATISFACTION NOT A SINGLE MISFIRE HAS SO FAR BEEN EXPERIENCED."

## *The fifth consecutive Land Speed Record on K·L·G Plugs!*

K·L·G SPARKING PLUGS LIMITED, LONDON, S.W.15



DAY BOMBERS: No. 33 (Bomber) Squadron in Squadron Formation. The Machines are Hawker "Harts" with Rolls-Royce "Kestrel" Engines. (*Flight* Photo.)

Advt.

however, feasible—exactly how great cannot be decided until practical tests have been made. During the altitude record flights, it should be remembered, the machines carried only the pilot and a relatively small quantity of fuel. For high-altitude commercial flying it will be necessary to carry a substantial payload and a large quantity of petrol.

A short time ago it was announced that the British Air Ministry had decided to order a high-altitude aeroplane. Doubtless this will be used for probing into the numerous difficulties, technical, physical and physiological, which have to be overcome before "stratosphere" flying can become a practical proposition. In France one or two constructors have built high-altitude machines, the Junkers company in Germany has experimented with one, and the Italians are known to have established a special department for studying the subject. It is, therefore, very right and proper that Great Britain should not lag behind. The fantastically great speeds which dreamers and visionaries expect from stratosphere flying are not likely to be attained, but practical experience may show that quite substantial gains in commercial speed are possible.

## *Empire Air Day*

IT has now been definitely decided that Empire Air Day will be held on Saturday, May 25. On that day R.A.F. stations in all parts of the country will be thrown open to the public from about 2 p.m until dusk. Arrangements have been made for the Saturday to be observed as an ordinary working day, thus ensuring that the public will see all the normal flying activities at R.A.F. stations.

Civil aerodromes will also be opened, and at these it is hoped to arrange "joy rides" at especially low fees.

The Air League of the British Empire has already met with a good response to its request for the services of licensed "B" pilots to take up passengers on Empire Air Day, but it hopes that private owners of machines will put them at the disposal of the League for passenger flights.

The public will also have an opportunity of seeing "behind the scenes" in aircraft manufacture; constructors are co-operating by throwing open their factories to the public.

There will be a uniform entrance fee to R.A.F. and civil aerodromes of one shilling for adults and threepence for children. The proceeds will go to the R.A.F. Benevolent Fund.

Empire Air Day was first promoted by the Air League on May 24 last year with the co-operation of the Air Ministry. On that day more than 130,000 people visited the various civil and military aerodromes, and £2,500 was handed by the Air League to the R.A.F. Benevolent Fund.

It is possible that the observance of Empire Air Day this year will be extended to India and other parts of the Empire.

## *Scott on Long-distance Flying*

Speaking at Foyle's fifty-third "Literary Luncheon" in London last week, Mr. C. W. A. Scott (who has, since winning the England-Australia Race with Mr. T. Campbell Black, established himself as one of those few people who can both do things in the air and then talk about them entertainingly afterwards) gave a brief outline of the history of flying between England and Australia.

He very rightly laid credit for the beginning of an era of solo flights between the two countries at the feet of that great pioneer who has hitherto received so little credit for the work he did—the late Sqn. Ldr. Bert Hinkler.

Mr. Scott gave a first-rate answer to those people who went what might be called "Douglas mad" after the race: he pointed out very clearly the facts which had led to the development of that particular type of aircraft in America and to our own slower, but more economical, class of air liner used in this country; despite the fact that we have been confined to the more truly commercial type of aircraft, in less than nine months we had been able to design and build a machine to beat the American class of aeroplane, which was the result of years of experience in that class of work.

## *A Trade-route "War"*

The naval manœuvres between the Home and Mediterranean Fleets, which ended on the morning of March 15, taught one lesson, namely, that the possession of a large number of aircraft is a great advantage to an admiral who has been given the task of clearing the seas of commerce-raiders.

At this stage it is impossible to comment more constructively on the value of naval aircraft for patrolling trade routes. The Red fleet possessed two aircraft carriers, but for the first two days of the manœuvres their reconnaissance machines do not appear to have hindered to any great extent the "capture" of mercantile shipping. At the same time the losses of the Blue destroyers were very heavy, and no doubt they were occasioned to some extent by aircraft.

The chief use made of the aircraft was for scouting purposes, but the *Queen Elizabeth* (Blue) and two Blue cruisers were "attacked" by Red aircraft, although nearly a hundred miles from any Red ship. Their speed was seriously reduced as a result of the damage received during this attack. On the Red side one of the carriers was sunk. It is evident that in reasonably fine weather aircraft from carriers can, to a considerable extent, make up for a lack of cruisers.

## *Death of "Tony" Spooner*

It is with the greatest regret that *Flight* has to record the death last Friday of Capt. Tony Spooner, as the result of an accident, ten miles west of El Arish, to a Misr-Airwork "Dragon" which he was piloting. It is understood that the accident occurred in a very thick dust storm. One engine stopped and, with the other failing, a landing was attempted on the dunes near the coast.

Capt. Spooner was chief pilot to Misr-Airwork and was highly experienced in the operation of the air lines started by that company in Egypt.

In 1929, with the late Capt. Sparkes, he was instructor to the Montreal Flying Club, a position which he gave up three years ago to go to Egypt. He was undoubtedly very largely responsible for the success of the air lines in that country, and his likeable personality won for him the endearment of all those people, both Egyptian and of other nationalities, who were connected with flying in that country.

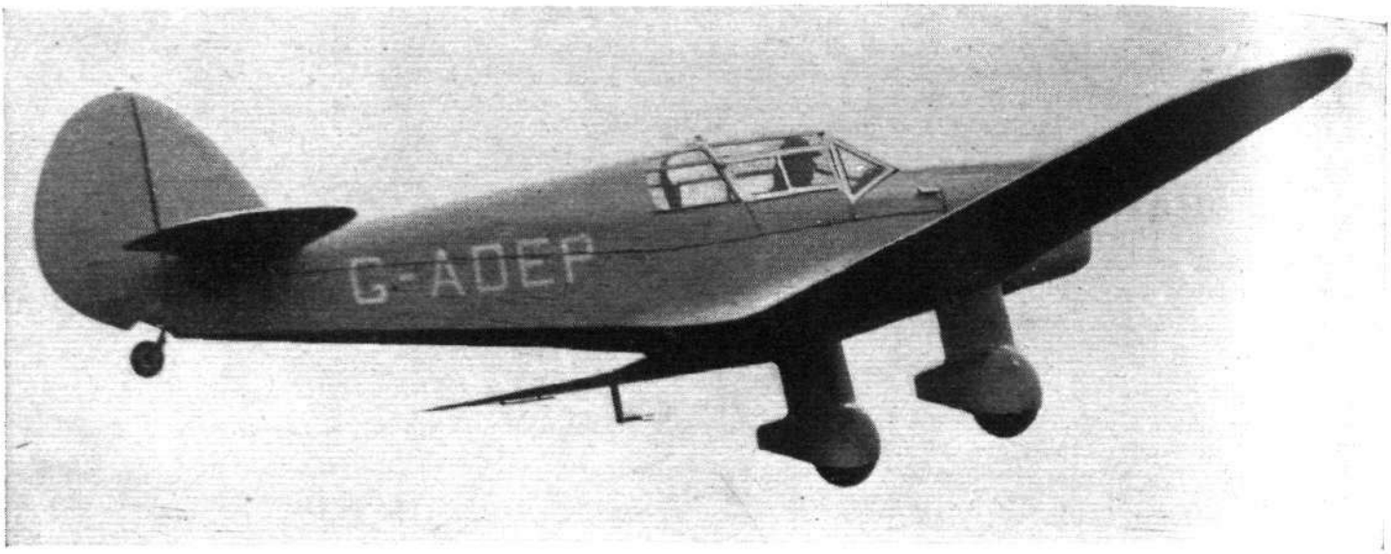
To Mrs. Spooner, his wife, we offer our deepest sympathy; incidentally, it is her wish that instead of Glenda Graham, the name by which she was so well known in Fleet Street, she shall in future only be referred to as Mrs. Tony Spooner.

The accident occurred en route for Palestine. Two Swiss passengers, Col. Frey and Mr. Scamidheini, both of Basle and connected with the cement industry in Egypt, were also killed. Col. Cuthbertson, a retired Territorial officer, and Mr. David Henderson, who is on the staff of the Iraq Petroleum Co., were injured.

## *Forthcoming Events*

Club Secretaries and others are invited to send particulars of important fixtures for inclusion in this list.

**Mar. 23.** Rugby: R.A.F. v. Army, Twickenham.
**Mar. 26.** "For and Against 'Sea-dromes'." Debate led by Mr. Nigel Tangye, at Women's Engineering Society, 20, Regent St., London.
**Mar. 29.** Annual Dinner. Norfolk and Norwich Aero Club. Mousehold Aerodrome.
**Apr. 9.** "Possible Effects of Flying on Future Generations." Debate at Women's Engineering Society, 20, Regent St., London.
**Apr. 15.** "Commercial Aircraft." R.Ae.S. Lecture by Capt. G. de Havilland.
**May (Date not yet fixed).** Wilbur Wright Lecture, R.Ae.S. by Mr. Donald W. Douglas.
**May 5.** R.Ae.S. Garden Party, Fairey Aerodrome, Great West Road.
**May 29.** Household Brigade Flying Club. Night-Flying Demonstration, Heston.
**June 1.** Brooklands "At Home."
**June 8.** London Aeroplane Club. Garden Party, Hatfield.
**June 15.** R.A.F. Flying Club Annual Display, Hatfield Aerodrome.
**June 29.** Royal Air Force Display, Hendon.
**July 13.** Opening of Leicester Municipal Airport.
**Aug. 24-25.** Third International Flying Meeting, Lympne.
**Sept. 6-7.** King's Cup Air Race.




# THE 1935 MODEL "GULL"

*Comfortable Touring for Three at 150 m.p.h. : a Speed Range of 3.6 to 1*

AT Gravesend aerodrome last Thursday, Captain E. W. Percival introduced his 1935 model "Gull." Generally speaking, the new machine retains the main features of last year's model, but a few modifications have been made and certain features added which together render the "Gull" thoroughly up to date in the private-owner's class. Split trailing-edge flaps reduce the landing speed and steepen the approach, while differentially operated wheel brakes reduce the landing run, so that the machine can be brought into a reasonably small field. At the same time, the aerodynamic design is such that a high maximum speed and a cruising speed of 150 m.p.h. are attained when the power plant is a 200 h.p. D.H. "Gipsy Six" six-cylinder-in-line air-cooled engine. With engines of lower power the performance is, of course, correspondingly reduced, but is still quite good. For example, with the Napier "Javelin" the cruising speed is 140 m.p.h., and with the "Gipsy Major" or "Hermes IV" it is 130 m.p.h. These figures apply when carrying pilot and two passengers.



**Capt. E. W. Percival (right), designer of the "Gull," with Mr. Gooding, a director of Gravesend Airport, where the machines are built.** (*Flight* photograph.)

The cabin is airy and well lighted by large windows. Fresh air is drawn in from a point on the wing sufficiently far outboard to preclude engine fumes entering the cabin, and for really hot weather some of the windows can be opened, although this admits a certain amount of engine noise. With the windows closed, the noise level is by no means high. The seats are arranged one behind the other and slightly staggered. In spite of the relatively small width of the cabin there is sufficient room, and the controls have been so arranged as to leave the floor space completely free. Behind the cabin there is a luggage compartment, closed by a separate door.

Cabin doors of large area are fitted, and an arrangement of spring-loaded cables ensures that the doors remain open while passengers are getting in and out. The doors impress one as being particularly solid and rigid, in distinct contrast to the flimsy contraptions found on some machines. The stout member which runs lengthwise over the central roof inspires confidence, not only in its ability to transmit the loads in spite of the large doors, but also in its effectiveness as a skid in the



**The 1935 "Gull" : Note the new windscreen, which has been found to shed the rain and leave the view unimpaired.** (*Flight* photograph.)



Flying at 50 m.p.h. : The "Gull" with split trailing-edge flaps down. (*Flight* photograph.)

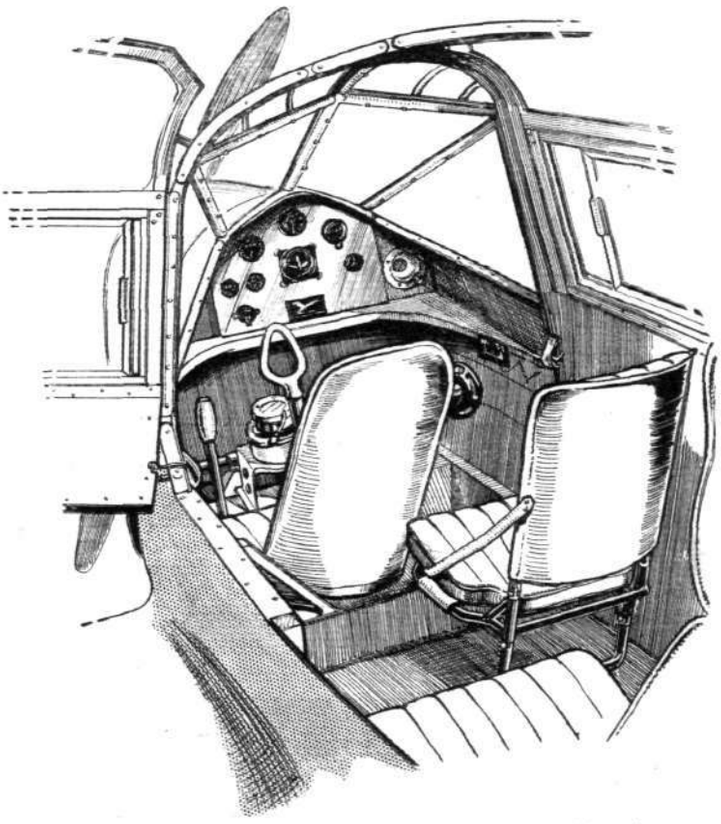
unlikely event of the machine turning over on the ground.

The split trailing-edge flap gear is very ingenious, and Capt. Percival has managed to evolve a system which will appeal to the pilot by reason of its mode of operation. The flaps, which do not extend across the bottom of the fuselage, are worked by a plain lever placed on the left-hand side of the pilot. When the flaps are in the "up" position, the lever lies flat on the floor. As it is raised the flaps come down until, when the flaps are fully down, the lever is self-locked in the uppermost position. The arrangement is logical, being exactly the equivalent of the hand-brake lever on a motor car, and the pilot has the "feel" of the flaps throughout the whole range. The load on the lever, by the way, does not exceed about eight pounds, a weight which is well within the capacity of even a woman pilot. and which has been attained by an ingenious system of levers, toggles and springs. Ball bearings ensure easy and smooth working.

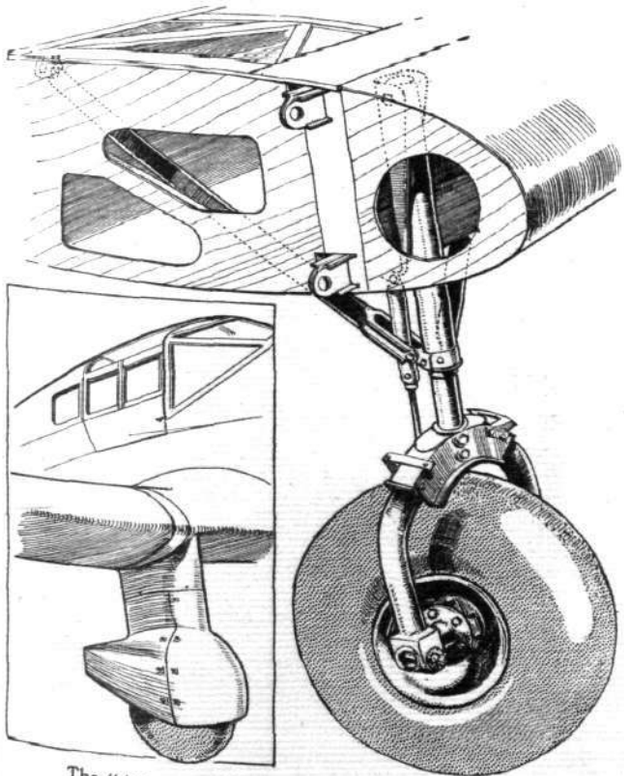
A "trousered" undercarriage is fitted, similar to that of the 1934 "Gull," but the fairings have been redesigned and are now of pleasing appearance and very low drag. A castering tail wheel in conjunction with Dunlop main wheels fitted with Bendix brakes makes manoeuvring on the ground very easy. The wheel brakes are applied by a small lever placed next to the air brake lever. Differential braking is effected *via* the rudder pedals.

A controllable-pitch airscrew is not fitted as standard, but can be supplied at extra cost if desired. Doubtless it would shorten the take-off time somewhat.

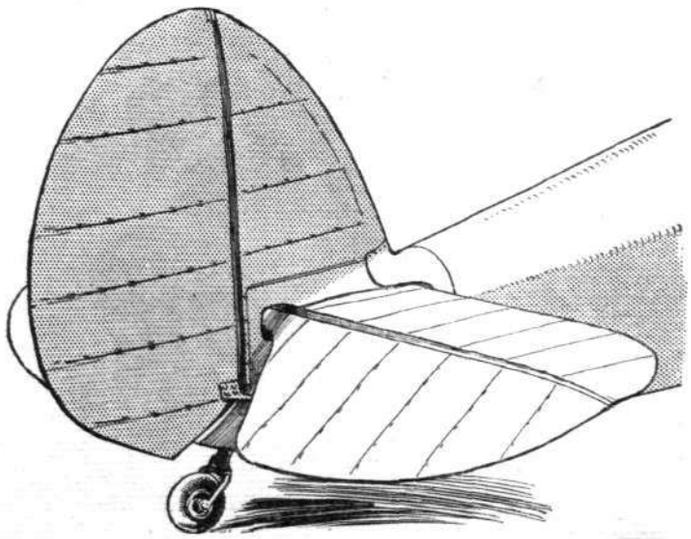
As in the earlier model, the wings are designed to fold, a



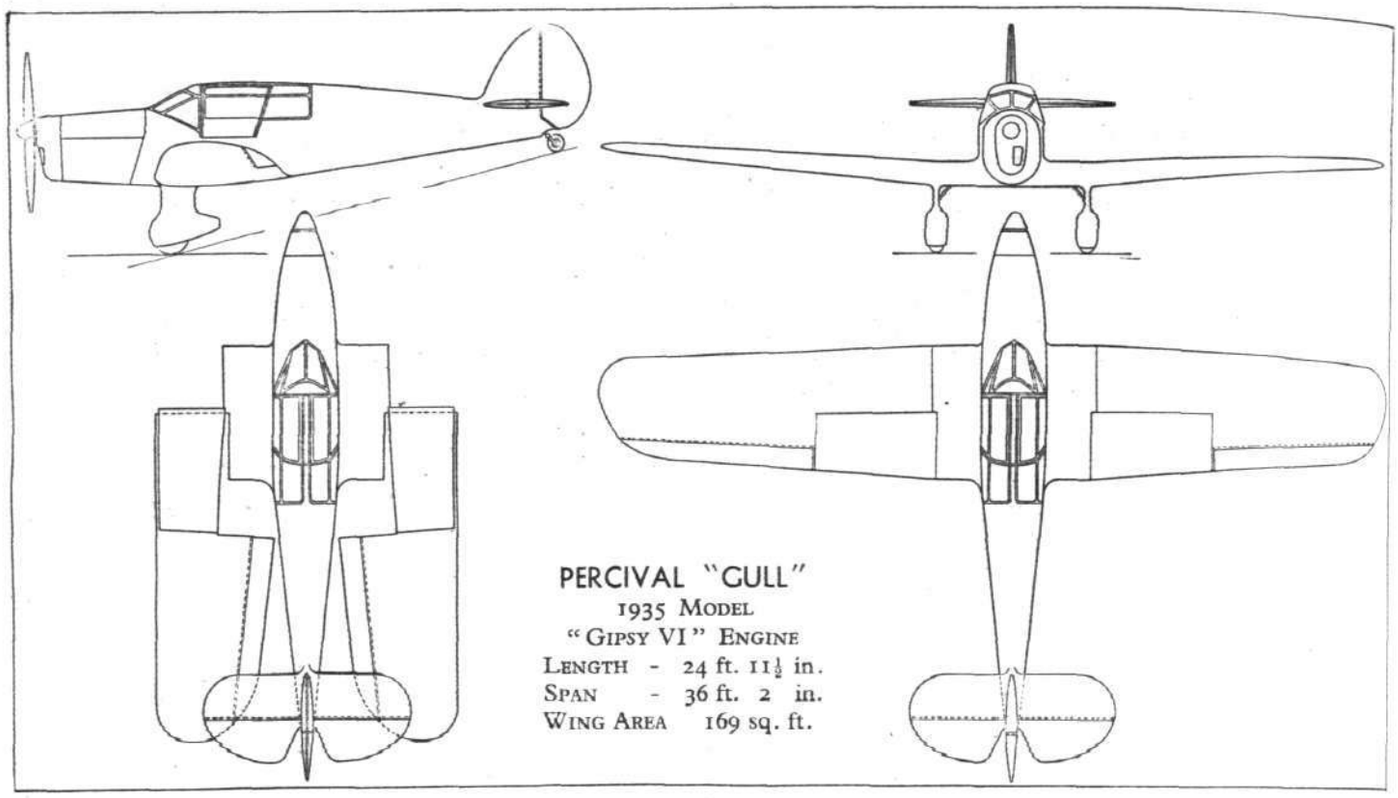
Light and Comfort : A view from above, looking into the cabin.



The "trousered" undercarriage and its details.



The tail units. Note the castering tail wheel.




hinged flap in the trailing edge on each side making this possible. The split flaps have to be divided to make folding possible, but an ingenious arrangement of the controls avoids any complications as far as the actual folding operation is concerned.

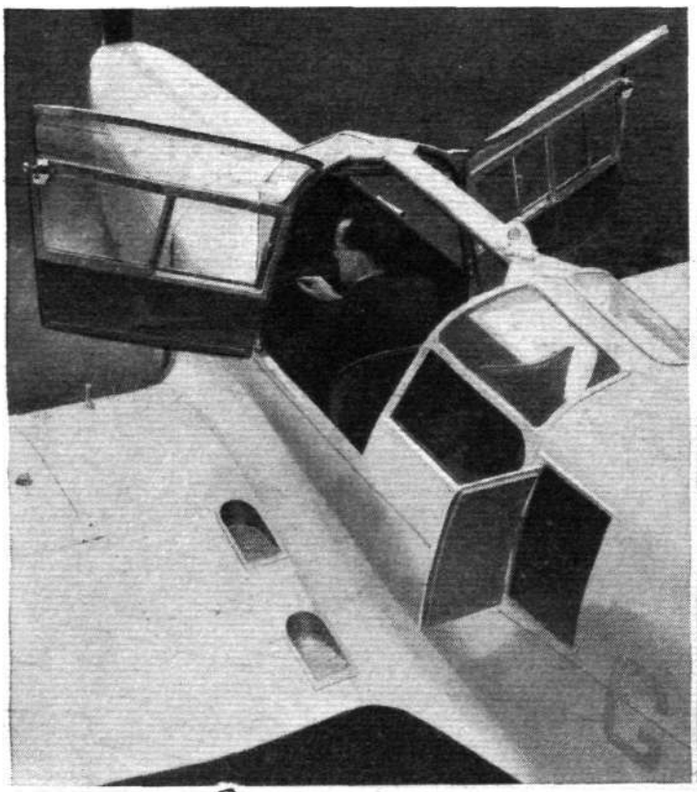
The maximum permissible weight of the "Gull" is 2,300lb. the tare weight is 1,450lb., 1,400lb., and 1,240lb. with the "Gipsy Six," Napier "Javelin" and "Gipsy Major" or "Hermes IV" respectively. The normal tankage is 31.5 gallons, which gives a range of 500 miles with the first two engines, and 575 miles with the last two. An optional alternative tankage of 40 gallons can be provided, also in the wings, which increases the ranges to 640 miles, 620 miles and 730 miles respectively. With the four alternative power plants the maximum speeds are 172 m.p.h., 160 m.p.h., and 148 m.p.h. respectively, the corresponding cruising speeds being 152 m.p.h., 140 m.p.h. and 130 m.p.h.

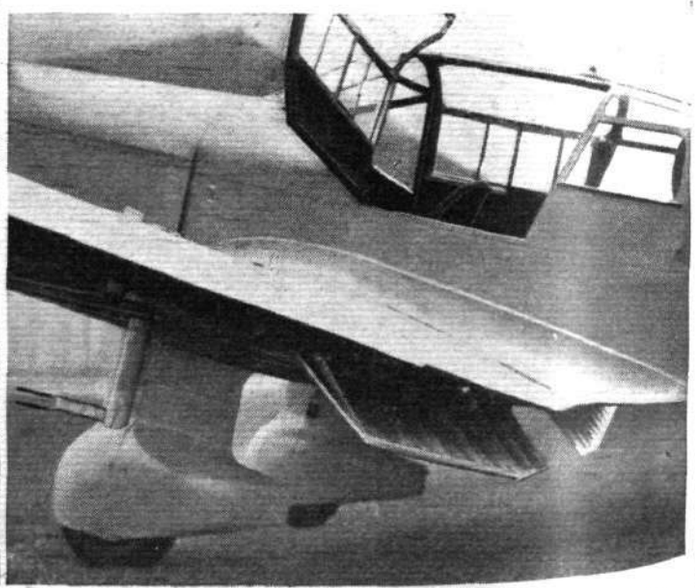
The efficiency of the aerodynamic design may be judged from the fact that the Everling "High-speed Figure" reaches a value as high as 29.25 for the "Gipsy Six" version. Structurally, also, the "Gull" is commendably efficient, the ratio of gross to tare weight being 1.586 for the machine with "Gipsy Six" engine, and 1.855 for the "Gipsy Major" and "Hermes IV" versions.

The finish of the new "Gull" is excellent. Capt. Percival informs us that one of the secrets is the application of a layer of nainsook over the plywood covering of the fuselage. This not only prevents splitting and raising of the grain, but forms an excellent foundation for the Titanine finish. The standard finish is turquoise blue for the fuselage and silver finish for the wing.

With "Gipsy Six," Napier "Javelin" and "Gipsy Major" engines the prices are £1,575, £1,475, and £1,275 respectively.

These prices include, as standard equipment, compass, air-speed indicator, altimeter, revolution counter, oil-pressure gauge, petrol and oil contents gauges, oil thermometer, watch, wheel brakes, and split trailing-edge flaps. A controllable-pitch airscrew can be supplied as an extra.

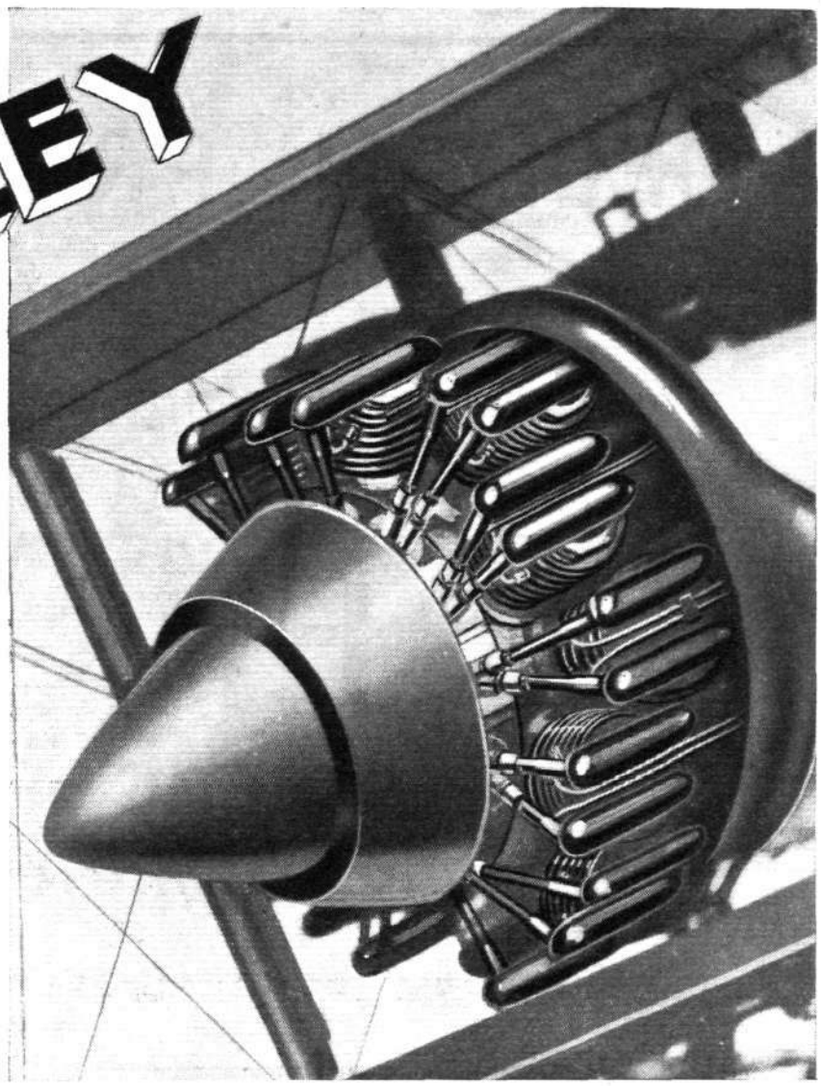




**"Open House": Note the size of the doors. The smaller door at the back gives access to the luggage locker. On the right is a view showing the trailing-edge flaps.** (*Flight* photographs.)

# SIDDELEY

## AIRCOOLED RADIAL ENGINES



## FACTS AND FIGURES

An Italian air transport operates over the Alps with six planes, each of which is fitted with 3 Siddeley "Lynx" 215 h.p. engines. 2,000,000 kilometres have been flown without any mishap. The engines have run 33,575 hours—equivalent to 1,343 hours per engine—and the planes have carried 20,000 passengers and 350 tons of mails and cargo. Jaguar 400 h.p. engines which are fitted in five Imperial Airways A.W. "Argosys" have exceeded 10,480,000 engine miles in Europe and North Africa. The eight "Atalantas" fitted with 4 "Serval" 240 h.p. engines, have flown over 2,815,000 engine miles in South Africa and India In Europe and the Near East, "Lynx" engines in two Avro Ten planes have flown 1,242,000 engine-miles, and "Genet Major" engines in three Westland "Wessex" planes have flown 713,700 engine-miles. All these performances have been accomplished with low fuel consumption and low maintenance and repair costs.

AS 96

**ARMSTRONG SIDDELEY MOTORS LTD., COVENTRY, ENGLAND**

# CELLON PROTECTION

●

*IN ADDITION TO THE WELL-KNOWN CELLON DOPE WE OFFER A WIDE RANGE OF*

# CERRUX

## SYNTHETIC FINISHES

***for all metal parts***

Supplied in rapid stoving or air drying types to conform to requisite Air Ministry Specification. This range not only effects economy in production, but also gives INCREASED PROTECTION.

●

If you have not already received a copy, send for the pamphlet CELLON PRODUCTS FOR THE FINISHING OF AIRCRAFT.

**CELLON LTD., Richmond Rd., KINGSTON-ON-THAMES**

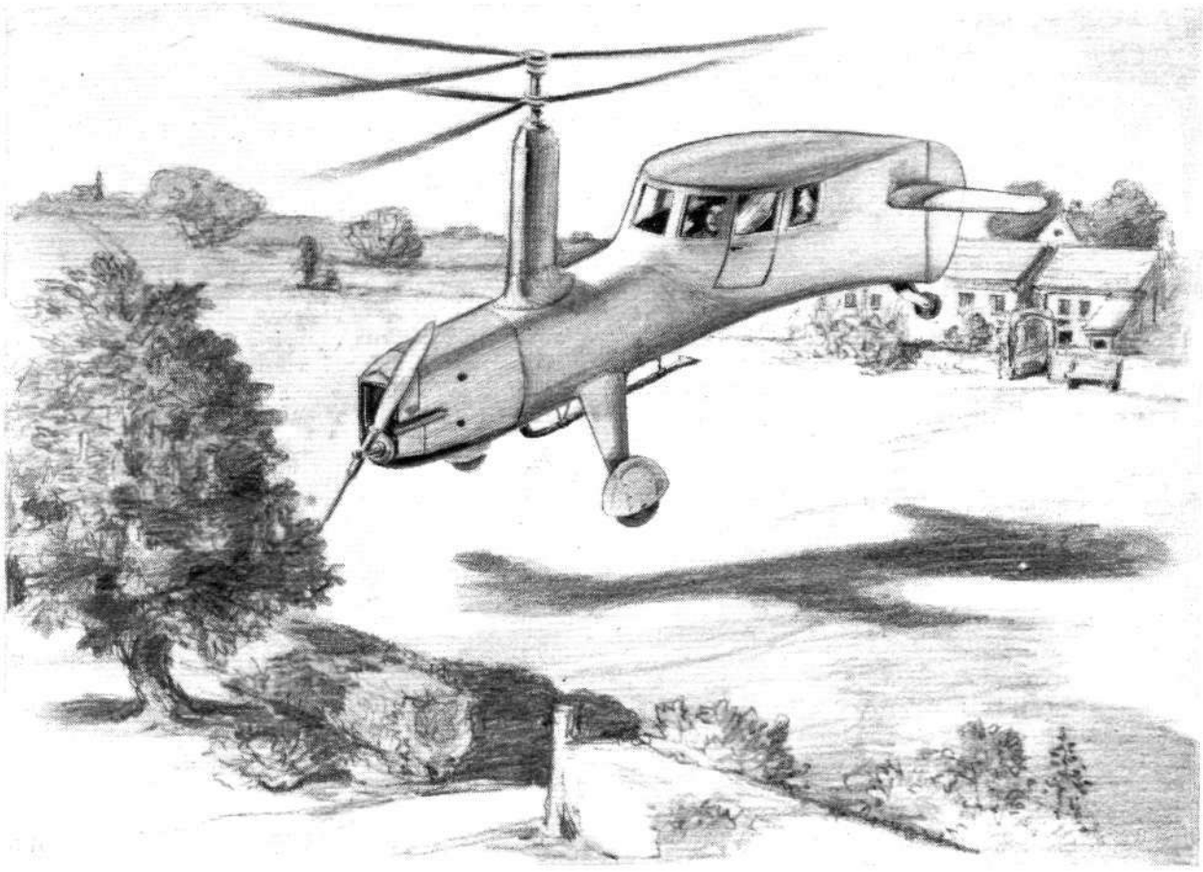
*(Contractors to H.M. and Foreign Governments.)*

# CELLON FOR FINE FINISHES

CVS-247

# THE CASE for the HELICOPTER

*In this Special Article for "Flight" Flt. Lt. Nicholas Comper, A.F.R.Ae.S., Discloses Some Remarkable Performance Figures for the Asboth Machine*



A *Flight* artist's impression of the Asboth helicopter, drawn from plans of the Hungarian inventor. The two sets of rotor blades revolve in opposite directions, thus cancelling out torque reaction.

TO Mr. Oskar von Asboth must be given the full credit of introducing the first successful helicopter with real commercial possibilities. The value of his investigation of the airscrew problem has long been recognised in this country, and fundamentally the success of the Asboth helicopter is due to the unique design of lifting system resulting from his research on the lifting airscrew.

The problem of stability and control which has baffled other helicopter experimenters has, in the opinion of the writer, been solved, and the Asboth helicopter can no longer be regarded as in the purely experimental stage. At the same time, some considerable development is, of course, necessary before the speed of the helicopter and its load-lifting capacity can rival that of the aeroplane, for the development of the aeroplane has had a full twenty years' start. It is with no apology, therefore, that the following modest performance figures are given for the first Asboth helicopter which is to be built as the prototype in this country.

It is to be a side-by-side two-seater cabin aircraft, powered with a 300 h.p. water-cooled engine. Thanks to the true direct-lift properties, the take-off and landing are not accompanied by any forward speed, and can be accomplished on a platform with approximately seven yards as its maximum dimension.

The initial rate of climb is 1,500 feet per minute, and this, of course, can be purely vertical ascent.

The maximum horizontal speed in level flight lies between 110 and 130 m.p.h., and a flying duration of two hours at normal r.p.m. is provided at full load, which includes pilot, passenger and 100 lb. of luggage.

Vertical descent with engine off is at a velocity of approximately fourteen feet per second.

As far back as 1928 the original Asboth helicopter, as first flown and as subsequently modified, made, in all, one hundred and eighty-two flights. Sustained flight was limited as the only motor then available was an air-cooled Le Rhône, but despite this a flight of 53 minutes' duration was made, and the total flying time was no less than 29 hours 7 minutes.

These facts set out, we can proceed to study their application to the wider aspects of wingless flight.

For many years now we have watched the growth of flying, and those of us who have become air-minded have had to become *aeroplane*-minded, for the development of other possible means of flight has been completely overshadowed by that of the aeroplane.

Being aeroplane-minded, we have had to accept the fundamental principle of obtaining lift—or, shall we say, buoyancy—by propelling the aircraft at some fairly high velocity through the air. So accustomed have we become to this principle that we are inclined to think in terms of development in ground organisation, fog dispersal, blind-flying instruments and many other aids with which to combat the elements.

If, however, we forget that we are aeroplane-minded and look at aviation dispassionately from an outside point of view, we might justly be astonished at some of the fundamental difficulties which prevent the aeroplane from operating with the same reliability and the same immunity from disaster which the older forms of locomotion possess. We might agree, too, that our puny resources offer little hope of ever bending the elements to our will.

The aeroplane cannot keep to a 100 per cent. schedule efficiency, neither is there anywhere near 100 per cent. immunity from disaster; and, generally speaking, the one condition of weather most unfavourable to the aeroplane and proving the cause of irregularities and mishaps, is the condition of "no visibility." No apologies are made for pointing out the obvious fact that while in fog both ships and trains can "heave to," the aeroplane cannot. Being aeroplane-minded, we have shut our eyes to this very simple essential of sound transport.

Looking at it from this point of view, does it not now seem ridiculous, in fact almost fantastic, that the orthodox aeroplane—that highly developed vehicle—has to remain hurtling along at speeds greater than 40 or 50 m.p.h. to maintain its buoyancy?

Now, knowing that we have got at last vertical ascent, stationary flight and vertical descent, it is very interesting to see what possibilities are immediately laid open.

Private, commercial, naval and military aviation have certain common requirements, but, in addition, there are those peculiar to each. Let us, therefore, consider these in turn.

To deal first with private aviation. We are accustomed to the use of the aerodrome or, failing that, some special surface for taking-off and landing. The helicopter can be taken off any surface or platform the dimensions of which need be no greater than its own. Climbing vertically to a safe height, the helicopter pilot then starts his journey by clutching in the tractor or pusher airscrews used for horizontal flight.

### *In "Blind" Conditions*

To obtain a very clear idea of the possibilities stationary flight introduces, let us assume a situation which up to date has been regarded as a veritable nightmare. We find ourselves flying in fog at night somewhere over the Midlands. Our ordinary instruments and the natural stability of the helicopter are all that we need for proceeding towards our destination with complete confidence. But assume we run out of petrol or the engine seizes, what happens then? As we are completely blind, all we do is to turn everything off and hold everything back and wait for the bump. But as we hit the ground in vertical descent at a velocity even less than that of the parachute, we are only likely to sustain damage either to the craft or to ourselves if we fall on, for example, a tree or a house.

Anyway, running out of petrol is inexcusable and the risks of engine failure do not belong to modern development; we may, therefore, consider a more likely hazard, namely, that of arriving at our destination and having to make contact with the ground without seeing it. Present-day ground organisation will direct us to a spot over the aerodrome and, as the helicopter can "heave to" in the air, we are in the enviable position of the fellow who "stopped, looked and listened." More than that, we can throw out one or more ropes and can take direct soundings of the position of the ground below, just as if we were plumbing the sea bed. A handling party may even pull us down on to the desired spot.

We have only got to study the commercial uses of the aeroplane in order to appreciate the potential value of the helicopter in this sphere. There is little that the aeroplane can do which the helicopter cannot do, and there is much that the helicopter can do which the aeroplane cannot do. We will, therefore, only touch on some of the new utilities provided: Taxi work from aerodromes to the heart of cities, for instance; roof aerodromes for aeroplanes, even if not considered fantastic, involve vast expenditure, but alighting places for helicopter "taxis" are a very different matter. Mail-carrying, traffic control, crop-spraying, advertising, photography and innumerable other jobs of work will be so simplified that they will constitute normal commercial activities.

And now for the naval aspect. The helicopter, as has been said, can lift directly from a platform, but it can also take off forwards, sideways, or backwards, and, further, it follows that wind direction on a take-off or in landing is of relatively small importance. Such advantages are significant when operations on ships' decks are considered.

### *On the Water*

The amphibian aircraft becomes a simple proposition. As the take-off is direct, no special hull or float shape is required. A water-buoyant cabin may be lifted from the water, and, while wheels may be desirable for handling purposes, they are not necessary for parking on *terra firma*. A boat or float aeroplane on its take-off may have to plough through rough seas at speeds as great as 80 m.p.h., and limitations in the strength of float or hull restrict the use of such aircraft if the seas are too rough.

For military work, the helicopter may be released from a camouflaged sunken hangar with roof doors. Stationary flight is advantageous for nearly all military purposes, but where the high order of vulnerability of the captive balloon or dirigible has long been accepted, the helicopter, when attacked, is free to ascend vertically with a high rate of climb, leaving the attacking aeroplane whizzing past it, only in firing range for a few seconds, or at will proceeding horizontally at equivalent high velocities.

Observation, bombing, photography, and fighting, once free of the whirlwind necessity of high speed, are all reduced to deliberate operations, while pursuit and retreat can still have all the speed and despatch of an aeroplane.

In the foregoing some of the many utilities of the helicopter have been mentioned, but, without question, the range of usefulness of the type is almost unlimited. Just as the steam engine and the motor car revolutionised all surface transport, so may we expect the helicopter principle of flight to effect a complete change in the present-day conception of aerial transit.

---

# FOR AIR FRANCE

## *The Potez 62 : Cruising Speed of 175 m.p.h. with Fourteen Passengers*

AMONG the fast new machines to be put in service during the coming season on the Europeon routes of Air France is the Potez 62, which has recently passed its constructor's trials, and is shortly to be presented at Villacoublay for official tests.

The machine is a commercial adaptation of the Potez 54 *multiplace de combat* (two Hispano-Suiza Xbrs) shown in the Grand Salon last year. Of "semi-thick" section, the wings are parallel in chord and have rounded tips. They are built in two sections, and are braced by struts and wires to the engine nacelles, which are carried well below the wings, and are, in turn, braced to the fuselage. Aluminium alloy is used for the wing structure, which consists of two spars to which the main ribs are attached. A series of lighter ribs and lateral stringers, with internal bracing, complete the structure. Fabric is used for the covering.

Wood is used exclusively for the cabin, which has been thoroughly soundproofed, is well ventilated and heated, and embodies several modern refinements.

The two Gnome-Rhône "Mistrel Major 14 Krsd" fourteen-cylinder two-row radials, giving 900 h.p. at 4,920 ft., are fitted with N.A.C.A. cowlings, and drive three-bladed metal airscrews. Each half of the undercarriage is of cantilever construction, and folds into the nacelles behind the engines. A photograph of the machine appeared last week.

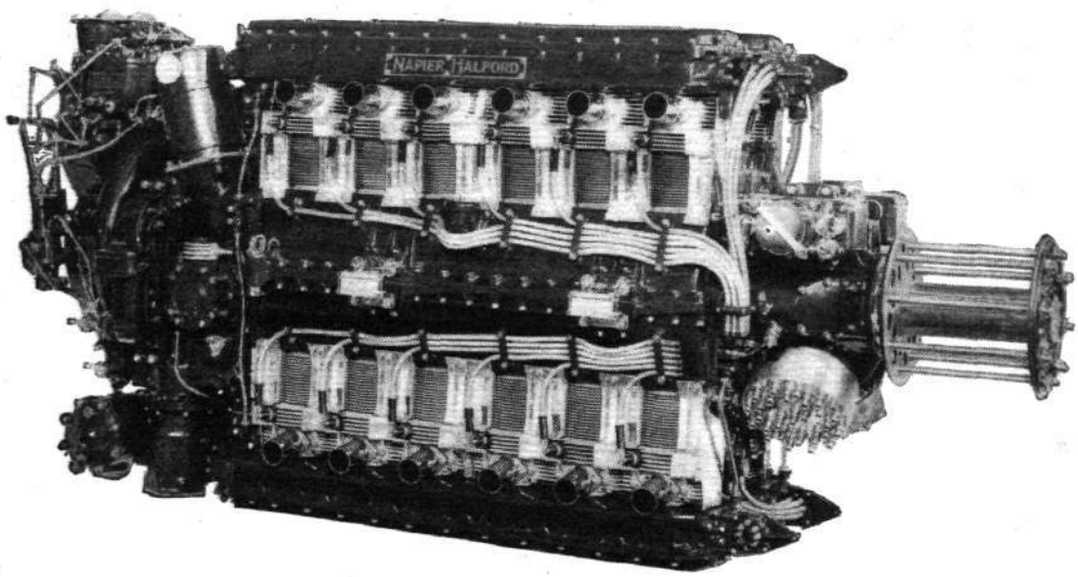
Data are as follows:—

**Dimensions.**—Length, 56 ft. 3 in. (*17,3 m*); height, 12 ft. 8 in. (*3,9 m*); span, 72 ft. 6 in. (*22,35 m*); wing area, 819 sq. ft. (*76 m²*).

**Weights.**—Weight empty, 8,800 lb. (*4 000 kg*); gross weight 15,765 lb. (*7 166 kg*).

**Performance.**—Cruising speed, 175 m.p.h. (*280 km/hr*); ceiling 26,000 ft. (*8 000 m*); range (normal), 625 miles (*1 000 km*); range (maximum), 844 miles (*1 350 km*); cruising speed (one engine), 131 m.p.h. (*210 km/hr*); ceiling (one engine), 13,000 ft. (*4 000 m*).

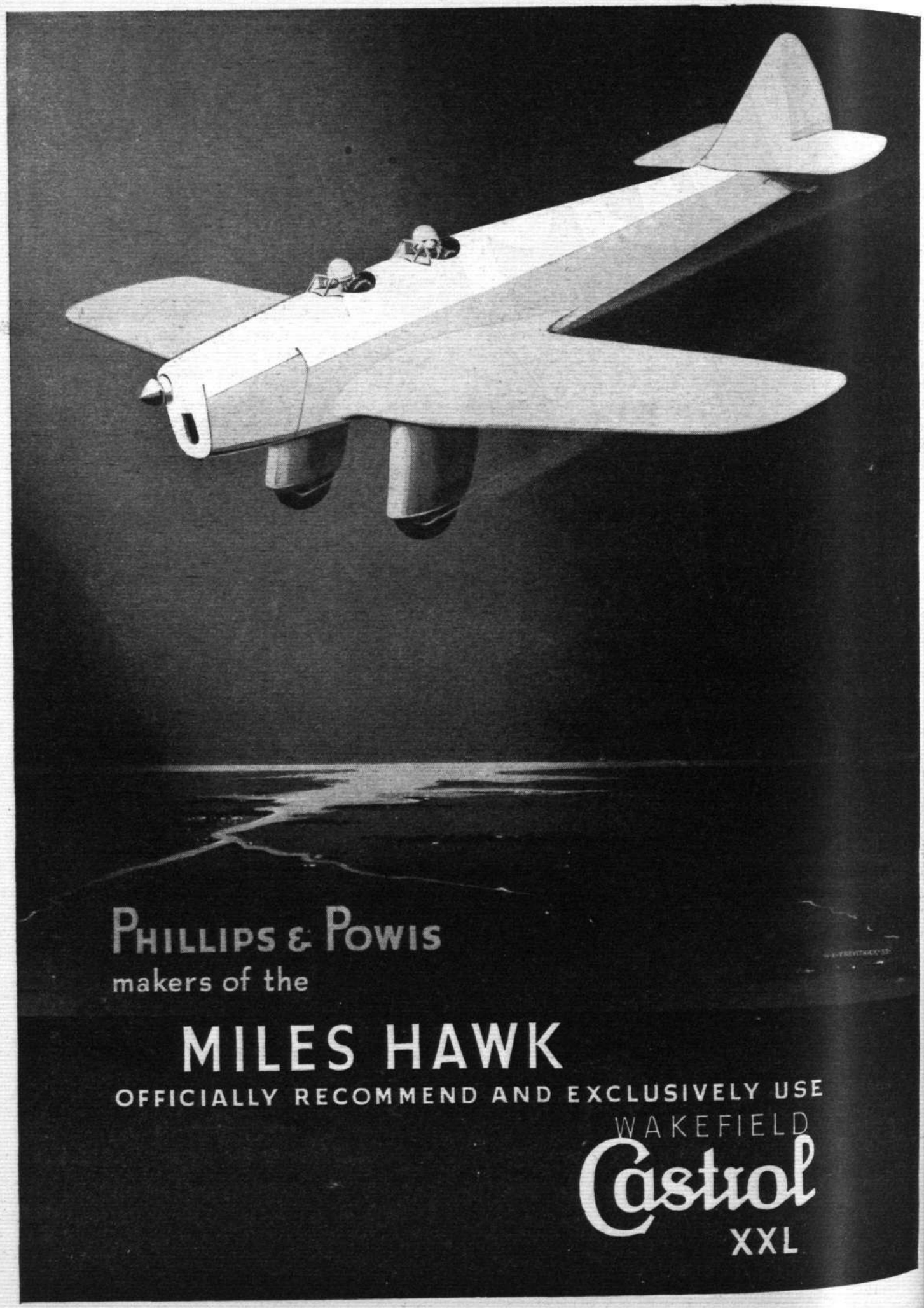
# Dagger




## The NAPIER-HALFORD AIR-COOLED AERO ENGINE

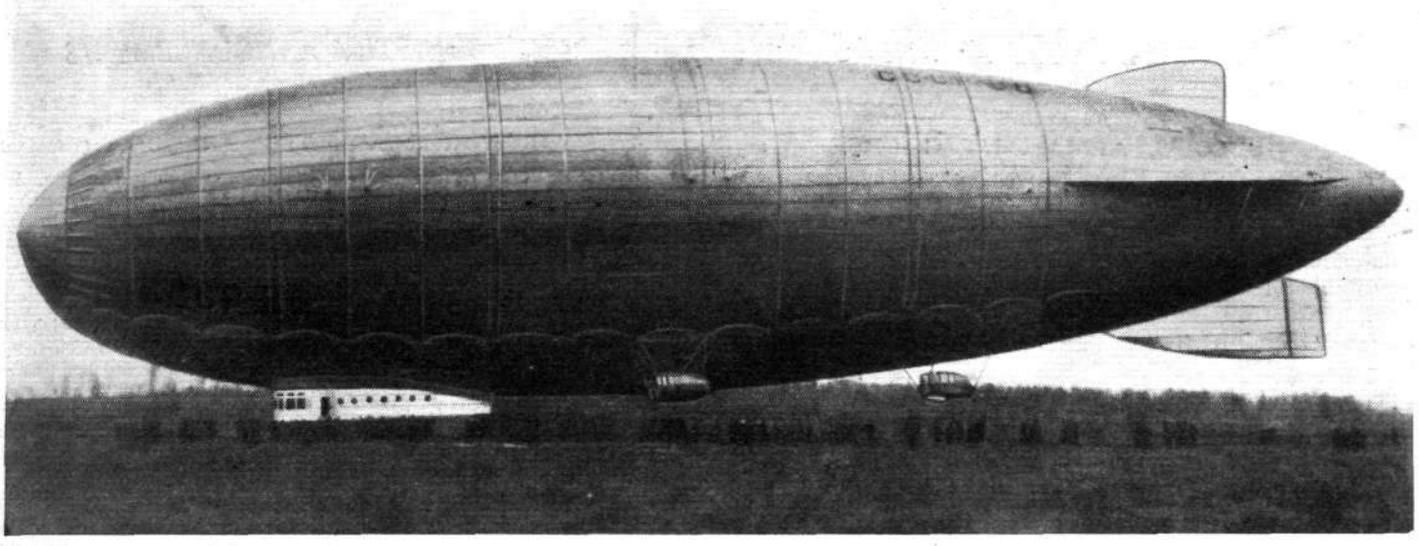
D. NAPIER & SON, LIMITED, ACTON, W.3.

*Kindly mention "Flight" when corresponding with advertisers.*


PHILLIPS & POWIS
makers of the
MILES HAWK
OFFICIALLY RECOMMEND AND EXCLUSIVELY USE
WAKEFIELD
Castrol
XXL

# THE FOUR WINDS

## ITEMS OF INTEREST FROM ALL QUARTERS



**A SOVIET SEMI-RIGID :** Russia is proceeding with her airship programme in spite of the misfortune that has dogged lighter-than-air development in other countries. This is the "V-6" ("B" in Russian) which is now undergoing trials near Moscow. It is a semi-rigid with obvious "Nobile" characteristics.

### *The Jubilee Air Ball*

The Duke and Duchess of York have given their patronage to the Jubilee Ball arranged by the Air League of the British Empire, which is to be held at the Dorchester Hotel, London, on May 23. The ball is in aid of the fund recently inaugurated by the League to give financial help towards training young pilots.

### *Codos and Rossi Again*

MM. Codos and Rossi, the well-known French long-distance pilots, have just accomplished another fine non-stop flight. They left Porto Praya, Cape Verde Islands, in their famous Blériot 110 monoplane (Hispano-Suiza) *Joseph Le Brix* on Thursday last and reached Buc next day, having covered the 3,000 miles in 25 hours.

### *Wiley Post Almost Succeeds*

Making a second attempt to establish the first sub-stratosphere record flight across the United States, Wiley Post left Los Angeles on Friday morning in the *Winnie Mae*. Shortage of oxygen, however, forced him to land at Cleveland, 400 miles short of New York. He flew at an average of 25,000 ft. and covered the 2,163 miles in 8 hr. 4 min. (an average speed of 270 m.p.h.).

### *Portuguese Flight Mishap*

When the Portuguese pilots, Carlos Bleck and Carlos Macedo, were taking off from Lisbon to fly to Rio de Janeiro in their D.H. "Comet" *Salazar*, which was purchased from the Mollisons, the machine slewed to the left and hit the ground with one wing tip which, together with the undercarriage, suffered damage. A De Havilland engineer has been sent to Lisbon to supervise the dismantling of the machine, which is to be brought back to Hatfield for repairs.

### *Seaplane Wreckage Found*

Wreckage of a military seaplane, believed to be Spanish, has been washed up on the Algerian coast.

### *Duchess of Bedford's Air Tour*

The Duchess of Bedford is making another long-distance air tour, again in Africa. She is visiting Timbuktu and Nigeria, flying across the Atlas Mountains to the Sahara Desert. From Nigeria she will proceed to Khartoum, and thence home to England.

### *An Altivolant "Nimrod"*

A Hawker "Nimrod" single-seater fighter ("Kestrel IIIS") constructed under licence by the Danish Naval Aeroplane Factory and flown by Lt. Pontoppidan recently climbed to 34,448 ft., thus creating an unofficial Danish height record. The previous figure was 32,086 ft.

### *Twenty-five Years Ago*

*From "Flight" of March 19, 1910.*

"A strange craft was taken out at Issy for its initial trials on the 11th inst. This was the Cesar "Aeroplane-Mixte," a tandem biplane, above which is mounted a cigar-shaped gas bag of 100 cubic metres' capacity. The motor is a 50 h.p. Prini-Berthand, and the trials are said to have surpassed all expectations, but up to the present no details are obtainable. . . .

At Berlin . . . Herr Neumann brought out his new machine, which has eight wings and two propellers; but, unfortunately, two of the wings and one of the propellers were damaged, and so the trials had to be postponed."

### *Memorial to Zeppelin Crews*

The annual German memorial service in memory of the crews of the two German airships brought down at Cuffley and Potters Bar was held in Potters Bar churchyard, where the men are buried, on Sunday.

### *A Grouse*

Last week Mr. Max Wenner, of Batchcott Hall, Leebotwood, was granted by Mr. Justice Crossman an injunction against Mr. C. E. Hardwick and Mr. Alfred Morris to prevent gliding flights from the latter's sheepwalk on the brow of the hill, on the grounds that the gliding interfered with Mr. Wenner's sporting rights and spoiled the grouse shooting.

### *Air Jubilee on the Screen*

Development in the air has been included in the film "Royal Cavalcade," which has been produced by British International Pictures, covering the period 1910-1935. Louis Paulhan leaving Hendon in the London-Manchester Air Race of 1910, Alcock and Brown leaving for their Atlantic flight in 1919, Charles Lindbergh arriving in Paris from New York in 1927, the King inspecting R.A.F. aircraft in the War, and the England-Australia Air Race of last year are some of the historic events included.

### *The Captain*

An amendment to the King's Regulations for the Royal Air Force lays it down that on every flight where more than one pilot is carried (in an aircraft intended for two pilots) one will be detailed as "captain of the aircraft," and that he will have authority irrespective of rank over all the occupants in all matters concerning the flying and handling of the aircraft. In a dual control training machine the instructor is likewise to have authority over the pupil irrespective of rank.

# THE ROYAL AIR FORCE

SERVICE NOTES AND NEWS AIR MINISTRY ANNOUNCEMENTS

## SPECIAL ARMAMENT COURSE

The undermentioned officers, having successfully completed the specialist armament course at the Air Armament School, Eastchurch, which terminated on Jan. 19, 1935, are granted the symbol "A":—Wing. Cdr. R. L. Stevenson, M.B.E., Sqn. Ldr. W. R. Cox, M.C., A.F.C., Flt. Lt. J. D. Baker-Carr, F/O.'s W. E. Coope, R. B. Dashper, H. Eeles, W. F. C. Hobson, and D. M. T. Macdonald.

## COURSES IN FOREIGN LANGUAGES

The undermentioned officers have been provisionally selected to undergo training in foreign languages during the year 1936:— F/O. D. V. Johnson in Arabic, training to be held in Iraq, for one year or until preliminary examination is passed, whichever period is shorter, training to commence in course of trooping 1936-37; F/O. F. McD. Fenton in Kurdish, to be held in Iraq, for one year or until preliminary examination is passed, whichever is shorter, training to commence in trooping 1936-37; F/O. G. E. Valentine in Russian, at the School of Slavonic Studies, London, for three months commencing January, 1936; F/O. J. Worrall in Chinese at the School of Oriental Studies, London, for six months commencing October, 1936. F/O. H. T. Bennett commenced a course in Japanese at the School of Oriental Studies, London, in October, 1934. F/O. T. A. B. Parselle has been selected to attend a similar course in October, 1935.

## CIVIL AVIATION GROUND ENGINEERS' LICENCES EXAMINATIONS FOR SERVING OFFICERS AND AIRMEN

Examinations will be held as follows:—(i) London, weekly, on each Tuesday in April, May and June, 1935; (ii) Croydon, on the second Friday in April, May and June, 1935; (iii) Manchester, on the first Friday in June, 1935; (iv) Bristol, on the first Friday in April, 1935; and (v) Glasgow, on the first Thursday in May, 1935.

## R.A.F. POINT-TO-POINT RACES

The following races will be run concurrently at the R.A.F., Middlesex Yeomanry and 7th Hussars point-to-point races, to be held at Kimble, near Halton Camp, on Saturday, March 30, 1935:—(i) The R.A.F. Light Weight Race for the Marquess of Londonderry Cup. (ii) The Cranwell Hunt Cup Race for the Air Vice-Marshal Longcroft Cup. (iii) The Novices Race for the Duke of Sutherland Cup. Stabling and grooms can be accommodated free at Halton Camp. Further details may be obtained from: The Hon. Secretary, Halton Hunt and Polo Club, Halton Camp, Near Aylesbury, Bucks.

## 10 SQUADRON REUNION DINNER

No. 10 Squadron, R.F.C. (R.A.F.), Eighth Annual Reunion Dinner for all ranks will be held in London on April 13. Tickets, 6s.; apply to A. F. Williams, "Rozel," Amersham Bucks.

## No. 60 SQUADRON REUNION DINNER

No. 60 Squadron, R.F.C. (R.A.F.), first reunion dinner will be held on April 27 at The Two Chairmen, Dartmouth Street, Westminster, London, S.W.1. Tickets, 5s. each, are obtainable from A. L. Vivian, 2, Collingwood Avenue, Tolworth, Surrey.

## R.A.F. PATHOLOGICAL LABORATORY, HALTON

The name of the R.A.F. Pathological Laboratory, Halton, has been changed to "The R.A.F. Institute of Pathology and Tropical Medicine," Halton.

## SOUTH FARNBOROUGH AERODROME

Levelling operations are being carried out on South Farnborough aerodrome over an area 400 yards by 150 yards immediately south of the landing circle. The bad ground is marked by standard markings. The duration of the operations will be approximately six months from Feb. 12, 1935.

## R.A.F. FOOTBALL ASSOCIATION

Flt. Lt. W. R. Worstall, Home Aircraft Depot, Henlow Camp, Beds, has been appointed Hon. Secretary of the R.A.F. Football Association in succession to Flt. Lt. F. Porter, with effect from January 29, 1935.

## AIR FORCE ARTISTS' ASSOCIATION

The Air Force Artists' Association was established in 1933. It is anticipated that a second exhibition will be held in May, 1935.

Further details and application forms for membership may be obtained from the Honorary Secretary, Air Force Artists' Association, Netheravon, Wilts.

## R.A.F. YACHT CLUB

At the annual general meeting of the above-mentioned club, held on Feb. 1, 1935, it was decided that, with effect from Oct. 1, 1935, an entrance fee of one guinea will be payable by all new members except cadet members and pilot officers. The annual dance will take place on Friday, July 26, 1935, in the officers' mess, R.A.F. Base, Calshot. The annual regatta will be held on Saturday, July 27, 1935.

## R.A.F. BENEVOLENT FUND

The usual meeting of the Grants Committee was held at Iddesleigh House on Thursday, March 7. Mrs. L. M. K. Pratt Barlow, O.B.E., was in the chair, and the other member of the Committee present was Wing Cdr. H. P. Lale, D.S.O., D.F.C. The Committee made grants to the amount of £150 14s. 8d. The next meeting was fixed for Thursday, March 21.

## TARGET-TOWING PRACTICES AT BIGGIN HILL

Target-towing practices will be carried out by aircraft of the Anti-Aircraft Co-operation Flight in the area enclosed by a line joining Biggin Hill-Orpington Meopham-Stansted-Halstead-Biggin Hill during the period April 8 to May 22, 1935. Towing will only take place in daylight and in good visibility, with a cloud base not below 1,000 feet. The length of the tow will not exceed 1,000 feet.

## NIGHT FLYING WITHOUT NAVIGATION LIGHTS

Aircraft will be engaged in night flying within the area Chelsfield-Addington-Oxted-Sevenoaks-Chelsfield, to December 31, 1935, for three hours from half an hour after sunset daily. The aircraft will not exhibit navigation lights whilst flying above 5,000 ft. unless other aircraft are observed in the vicinity.

Aircraft will be engaged in night flying within the area enclosed by a line running south from Bedford to Littlehampton and east from Bedford to Orfordness, to August 31, 1935, daily from sunset to 2359 hrs.; also within a radius of 5 miles of Gosport aerodrome: March 5-8, from 2000 to 2130 hours; March 12 from 2000 to 2130 hours; March 14-15, from 1930 to 2100 hours; April 5, from 2045 to 2245 hours; April 8-9, from 2045 to 2245 hours; April 11-12, from 2045 to 2245 hours; April 15-16, from 2045 to 2245 hours; October 24-25, from 1800 to 1930 hours; December 9-10, from 1700 to 1830 hours; December 12-13, from 1700 to 1830 hours; December 16-17, from 1700 to 1830 hours.

Night flying exercises without navigation lights will be carried out by R.A.F. aircraft within the area bounded by a line joining Egham-Guildford-Alton-Reading-Egham, from April 1 to Sept. 30, 1935, from 2100 to 0500 hours. Aircraft will not exhibit navigation lights whilst flying above 2,000 feet unless other aircraft are observed in the vicinity.

## FOREIGN OFFICER WITH THE R.A.F.

Captain Napakas, of the Siamese Air Force, has been attached to No. 24 Squadron, Hendon, from February 27, 1935, to March 23, 1935, inclusive, for a refresher course, prior to further attachments.

During the coming financial year the Air Ministry estimate to receive £20,000 from other Governments in respect of the training of pupils at R.A.F. establishments. This shows an increase of £2,000 over the corresponding amount in 1934 and £5,000 over that of 1933.

## AIRCRAFT CARRIER "ARK ROYAL"

The Admiralty have announced that, subject to settling certain points of detail, they have decided to entrust the construction of the new aircraft carrier *Ark Royal* to Messrs. Cammell Laird and Co., Ltd., of Birkenhead. The new *Ark Royal* has been designed by Sir Arthur Johns, Director of Naval Construction. No details have yet been published, but in the Naval Estimates the sum of £493,498 is to be spent on her up to March 31, 1936.

## AIR DEFENCE AT GENEVA

The Canton of Geneva has refused to obey the Swiss Federal decree ordering all Swiss towns to organise exercises at the end of April to minimise the danger to the public of air attack. Certainly an air attack on Geneva seems beyond belief.

## R.A.F. STATION, CATTERICK

Until further notice only restricted facilities for aircraft will be available at the R.A.F. Station, Catterick. Aircraft must not land at Catterick except in an emergency, but should use Thornaby or Usworth.

## R.A.F. RIFLE ASSOCIATION

The fifteenth annual meeting of the R.A.F. Rifle Association will be held on the National Rifle Association ranges at Bisley, commencing on Monday, June 3, and concluding on Friday, June 7, 1935.

# ROYAL AIR FORCE GAZETTE

*London Gazette, March 12, 1935*
*General Duties Branch*

The following are granted permanent commissions as Pilot Officers with effect from February 28, and with seniority of the dates stated:—E. A. Howell (Aug. 28, 1933); R. A. I. Harrison (Feb. 28, 1934); J. P. Sloan (Feb. 28, 1934).

The following are granted short service commissions as Pilot Officers for five years on the active list with effect from and with seniority of Feb. 19:—W. E. Carr, A. D. Groom, H. V. Hoskins.

Flt. Lt. J. D. Baker-Carr is granted a permanent commission in this rank (March 13). P/O. on probation D. C. Oliver is confirmed in rank (Sept. 22, 1934). P/O. on probation R. G. Seys is confirmed in rank (Feb. 1). A.P/O. on probation J. J. J. Page is confirmed in rank and graded as Pilot Officer (Jan. 10).

The following Pilot Officers are granted seniority with effect from the dates stated:—W. F. Beckwith, G. H. Foss, P. E. Hadow (Aug. 28, 1933); W. G. Bannister, P. B. B. Ogilvie (Feb. 28, 1934).

The following Pilot Officers are promoted to the rank of Flying Officer:—B. H. Becker, B. A. Chacksfield, A. F. R. Bennett, W. B. Murray, R. G. Watson, N. C. Jones (Jan. 15); N. W. Wakelin (Feb. 12).

Sqn. Ldr. N. W. Wadham is placed on the retired list at his own request (March 10). Flt. Lt. F. Simpson is placed on the retired list at his own request (Feb. 26).

*Chaplains' Branch*

The Rev. J. J. Case is granted and permitted to retain the honorary relative rank of Group Captain on relinquishing his honorary commission (Feb. 9).

*Memorandum*

The permission granted to Sec. Lt. K. C. N. Marshall to retain his rank is withdrawn on his conviction by the civil power (Feb. 12).

### PRINCESS MARY'S ROYAL AIR FORCE NURSING SERVICE

The following Staff Nurses are promoted to the rank of Sister:—Miss V. Cummings (Jan. 27); Miss G. P. Taylor (Feb. 17).

### ROYAL AIR FORCE RESERVE

*Reserve of Air Force Officers*
*General Duties Branch*

The following are transferred from class A to class C:—Sqn. Ldr. E. H. D. Spence (Lt.-Cdr., R.N., Retd.) (March 4); Flt. Lt. A. H. C. A. Rawson (March 8).

FLYING OFFICERS.—S. N. Wiltshire (Sept. 8, 1934); H. Lyne (Dec. 16, 1934); W. R. Tope (Dec. 30, 1934); R. J. Cohen (Feb. 8); G. Clapham, A.F.C. (March 4).

The following Flying Officers relinquish their commissions on completion of service:—T. J. R. Cornewall-Walker (June 30, 1934); N. C. Ross-Roberts (March 13).

F/O. J. P. Sloan relinquishes his commission on appointment to a permanent commission in the R.A.F. (Feb. 28).

*Stores Branch*

Flt. Lt. E. P. Hardman, D.F.C., is transferred from class C to class B (Dec. 19, 1934).

### SPECIAL RESERVE

*General Duties Branch*

The following Pilot Officers on probation are confirmed in rank:—J. A. C. Warren (Nov. 26, 1934); M. A. Smith, P. Ruston, C. W. Rees, W. B. A. J. Keppel, R. K. Curzon (Feb. 2).

### AUXILIARY AIR FORCE

*General Duties Branch*

No. 602 (CITY OF GLASGOW) (BOMBER) SQUADRON.—F/O. E. A. Howell relinquishes his commission on appointment to a permanent commission in the R.A.F. (Feb. 28).

### TERRITORIAL ARMY

ANTI-AIRCRAFT SEARCHLIGHT BATTALION

27TH (LOND.) A.A.S. BN. (L.E.E.).—Capt. G. A. Vetch to be Maj. (Feb. 9); Lt. H. V. Tovey to be Capt. (Feb. 9).

# ROYAL AIR FORCE INTELLIGENCE

**Appointments.**—The following appointments in the Royal Air Force are notified:—

*General Duties Branch*

*Group Captains.*—R. B. Maycock, O.B.E., to Station Headquarters, Upper Heyford, 4.3.35; to command vice Group Capt. W. C. Hicks, A.F.C. F. G. D. Hards, D.S.C., D.F.C., to Headquarters, Fighting Area, Uxbridge, 1.3.35; on appointment as Senior Equipment Staff Officer vice Group Capt. T. E. B. Howe, A.F.C., A.D.C. J. H. S. Tyssen, M.C., to Headquarters, Fighting Area, Uxbridge, 5.3.35; for Air Staff (Training) duties. K. C. Buss, O.B.E., to No. 4 Flying Training School, Abu Sueir, Egypt, 9.2.35; to command vice Group Capt. A. ap Ellis, C.B.E.

*Squadron Leader.*—C. E. V. Porter, to Air Armament School, Eastchurch, 3.3.35; for Specialist Armament course.

*Flying Officers.*—T. G. Lovell-Gregg, to School of Naval Co-operation, Lee-on-the-Solent, 4.3.35. R. G. E. Catt, to No. 10 (B) Squadron, Boscombe Down, 4.3.35. R. G. Wilde, to School of Naval Co-operation, Lee-on-the-Solent, 4.3.35.

*Pilot Officers.*—P. H. Agard-Butler, to No. 820 (F.S.R.) Squadron, Gosport, 4.3.35. W. N. Ash, to No. 15 (B) Squadron, Abingdon, 4.3.35. C. L. Dann, to No. 2 (Army Co-operation) Squadron, Manston, 4.3.53. J. R. MacLachlan, to No. 19 (F) Squadron, Duxford, 4.3.35. W. D. Woods, to No. 35 (B) Squadron, Bircham Newton, 4.3.35.

*Acting Pilot Officers.*—M. H. de L. Everest, to No. 35 (B) Squadron, Bircham Newton, 16.2.35. M. Hallam, to No. 7 (B) Squadron, Worthy Down, 16.2.35. J. W. Hathorn, to No. 40 (B) Squadron, Abingdon, 16.2.35. G. A. Kitching, to No. 207 (B) Squadron, Bircham Newton, 16.2.35. W. E. Legard, to No. 40 (B) Squadron), Abingdon, 16.2.35. E. K. Piercy, to No. 65 (F) Squadron, Hornchurch, 16.2.35. J. B. Black, to No. 17 (F) Squadron, Kenley, 4.3.35. R. A. Charles-Auckland, to No. 10 (B) Squadron, Boscombe Down, 4.3.35. H. L. Dawson, to No. 57 (B) Squadron, Upper Heyford, 4.3.35. A. H. Donaldson, to No. 56 (F) Squadron, North Weald, 4.3.35. J. Duncan, to No. 10 (B) Squadron, Boscombe Down, 4.3.35. G. T. Gilbert, to No. 7 (B) Squadron, Worthy Down, 4.3.35. K. N. Lees, to No. 4 (Army Co-operation) Squadron, South Farnborough, 4.3.35. B. G. Morris, to No. 19 (F) Squadron, Duxford, 4.3.35. A. D. Murray, to No. 18 (B) Squadron, Upper Heyford, 4.3.35. R. J. C. Nedwill, to No. 25 (F) Squadron, Hawkinge, 4.3.35. J. S. O'Brien, to No. 3 (F) Squadron, Kenley, 4.3.35. J. Pilling, to No. 32 (F) Squadron, Biggin Hill, 4.3.35. L. W. Saben, to No. 9 (B) Squadron, Boscombe Down, 4.3.35. J. E. Thornton, to No. 33 (B) Squadron, Upper Heyford, 4.3.35. G. F. Chater, to No. 65 (F) Squadron, Hornchurch, 4.3.35. G. V. M. O'Reilly, to No. 22 (B) Squadron, Donibristle, 4.3.35. F. H. Roberts, to No. 22 (B) Squadron, Donibristle, 4.3.35. E. R. Bitmead, to No. 54 (F) Squadron, Hornchurch, 4.3.35. R. J. B. Burns, to No. 29 (F) Squadron, North Weald, 4.3.35. D. E. Cattell, to No. 40 (B) Squadron, Abingdon, 4.3.35. R. C. Crawford, to No. 41 (F) Squadron, Northolt, 4.3.35. C. J. S. Dickins, to No. 4 (Army Co-operation) Squadron, South Farnborough, 4.3.35. P. Fleming, to No. 207 (B) Squadron, Bircham Newton, 4.3.35. H. Georgeson, to No. 65 (F) Squadron, Hornchurch, 4.3.35. A. J. Guthrie, to No. 99 (B) Squadron, Mildenhall 4.3.35. J. D. C. Joslin, to No. 54 (F) Squadron, Hornchurch, 4.3.35. J. H. Kitson, to No. 58 (B) Squadron, Worthy Down, 4.3.35. R. C. Meares, to No. 22 (B) Squadron, Donibristle, 4.3.35. D. J. North-Bomford, to No. 111 (F) Squadron, Northolt, 4.3.35. G. I. Pawson, to No. 32 (F) Squadron, Biggin Hill, 4.3.35. L. H. Pomeroy, to No. 41 (F) Squadron, Northolt, 4.3.35. H. M. Starr, to No. 13 (Army Co-operation) Squadron, Netheravon, 4.3.35. J. M. Thompson, to No. 29 (F) Squadron, North Weald, 4.3.35. E. A. Verdon-Roe, to No. 10 (B) Squadron, Boscombe Down, 4.3.35.

The undermentioned Officers are Posted to Air Armament School, Eastchurch, for Specialist Armament Course:—

*Squadron Leaders.*—T. C. Luke, M.C., 4.3.35. S. F. Vincent, A.F.C., 5.3.35.

*Flying Officers.*—W. J. F. Bull, 5.3.35; C. H. B. Bullock, 4.3.35; A. M. Doran, 4.3.35; R. H. E. Emson, 4.3.35; A H Fear, 4.3.35; A. W. Geoghegan, 4.3.35; L. C. Slee, 4.3.35; M. F. D. Williams, 5.3.35.

*Stores Branch*

*Flight Lieutenant.*—O. D. Allerton, to Headquarters, Western Area, Andover, 5.3.35.

*Medical Branch*

*Air Commodore.*—A. W. Iredell, K.H.P., to D.M.S., Dept. of A.M.P., Air Ministry, 1.3.35; on appointment as Director of Medical Services vice A. W. M. J. McIntyre, C.B., M.C., K.H.S.

*Group Captain.*—F. C. Cowtan, to Headquarters, R.A.F., Halton, 6.3.35; for duty as Principal Medical Officer vice Group Capt. B. A. Playne, D.S.O.

*Squadron Leader.*—T. J. X. Canton, to Station Headquarters, Farnborough, 6.3.35; for duty as Medical Officer.

*Flight Lieutenants.*—A. M. Weston, to Station Headquarters, Kenley, 5.3.35. F. E. Lipscomb, to R.A.F. Base, Malta, 1.3.35.

# A DIRECT-START AUTOGIRO

## *Helicopter Performance Almost Attained : Start and Landing Without Run : Señor de la Cierva Discloses Details of His New Invention*

DISCLOSURES which bring within reach the possibility of flight from literally "anywhere to anywhere" were made by Señor Juan de la Cierva during a lecture on new developments of the Autogiro to the Royal Aeronautical Society last Friday. For once a secret has been well guarded in the aviation world, and the society was the first body to be given an outline of the new development, although the first flight without starting run was made as long ago as August, 1933. The details of the new rotor arrangement are still in the experimental stage, and Señor de la Cierva observed an understandable reticence concerning them, but it is evident that the fundamental problems have been solved, and that only a development period now lies between the experimental stage and the marketing of the new type of machine. How long that period is likely to be no one can foresee.



Señor de la Cierva.

The Chairman, Lt.-Col. J. T. C. Moore-Brabazon, in presenting the lecturer of the evening, recalled that in imitating nature man has to use different methods. Nature never introduced the wheel, for example. In the Autogiro, Mr. Cierva had imitated flapping flight by hinging his rotor blades.

The lecturer pointed out that during the last few years considerable progress had been made in the knowledge of the aerodynamics, dynamics and engineering requirements of the autogiro. One of the characteristics of the development had been the great number of secondary problems. The very large number of parameters had made difficult the correct compromising—the secret of all successful engineering. In many instances sacrifices had to be made in one direction in order to improve some other point until increased knowledge permitted to redress the balance again. Simultaneous progress all along the line was only possible when a final formula had been established, and the autogiro was only now arriving at that stage.

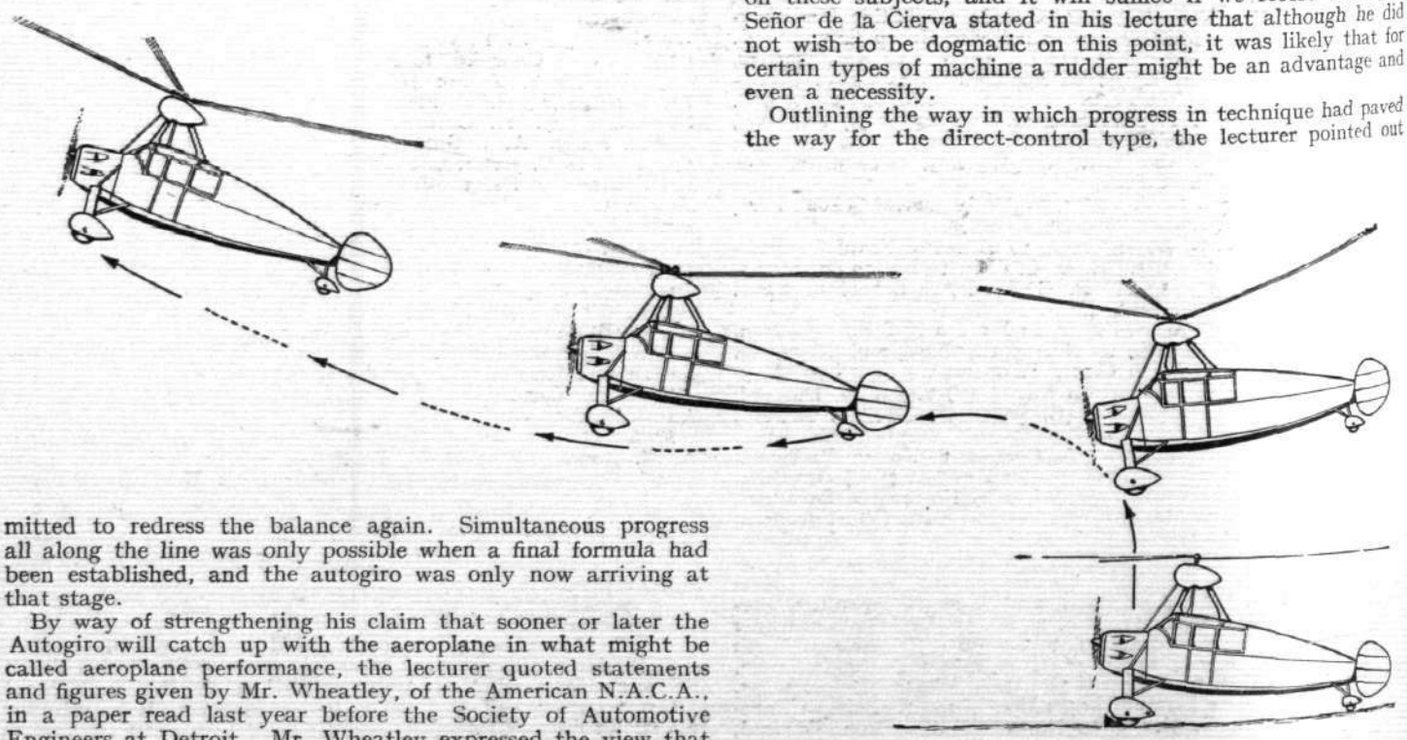
By way of strengthening his claim that sooner or later the Autogiro will catch up with the aeroplane in what might be called aeroplane performance, the lecturer quoted statements and figures given by Mr. Wheatley, of the American N.A.C.A., in a paper read last year before the Society of Automotive Engineers at Detroit. Mr. Wheatley expressed the view that although maximum L/D ratios of present day rotors were of the order of 8 or 10, values from 12 to 15 might be obtained at higher speeds without serious difficulty. Mr. Wheatley also predicted a speed range of 28 to 200 m.p.h. for the Autogiro. Señor Cierva stated that the most efficient rotor so far produced had a maximum L/D of 13 to 14, which represented an increase of some 40 per cent. on the best rotor of five years ago. At the same time the maximum lift coefficients had been very materially increased. The general conclusion reached was that all-round good aerofoils for aeroplanes were also good aerofoils for a rotor. Improvements in efficiency due to smaller solidities were very important. Early Autogiros had solidities of the order of 0.2 Now solidities of 0.06 were in normal use, and in one instance a value as low as 0.034 had been obtained.

Some "high lights" in Autogiro performance were quoted. For example, the most efficient machine built hitherto had a top speed of 110 m.p.h. and carried a useful load of 500 lb. with an engine of 75 h.p. only. Another had a maximum speed of 125 m.p.h. Minimum speeds of 15 m.p.h. had been obtained with very lightly loaded machines. The maximum altitude reached by an autogiro was 21,000 ft. The lecturer pointed out as an anomaly that in spite of the many records recognised by the F.A.I., Autogiro records were not accepted.

After outlining some of the dynamical problems encountered and the way in which they had been solved, Señor de la Cierva mentioned that for relatively high values of the forward speed to tip speed ratio, the possibility existed that the blades of the rotor might become unstable in flapping. After mentioning that blade flexibility in many cases reduced bending moments by 75 or 80 per cent., the lecturer stated that one of the most interesting conclusions arrived at from a study of the subject of bending moments was that maximum bending stresses were almost independent of the weight of the machine, being a definite characteristic of each design of blade.

Direct control and the suppression of the rudder were next dealt with, but readers of *Flight* have been kept well informed on these subjects, and it will suffice if we record here that Señor de la Cierva stated in his lecture that although he did not wish to be dogmatic on this point, it was likely that for certain types of machine a rudder might be an advantage and even a necessity.

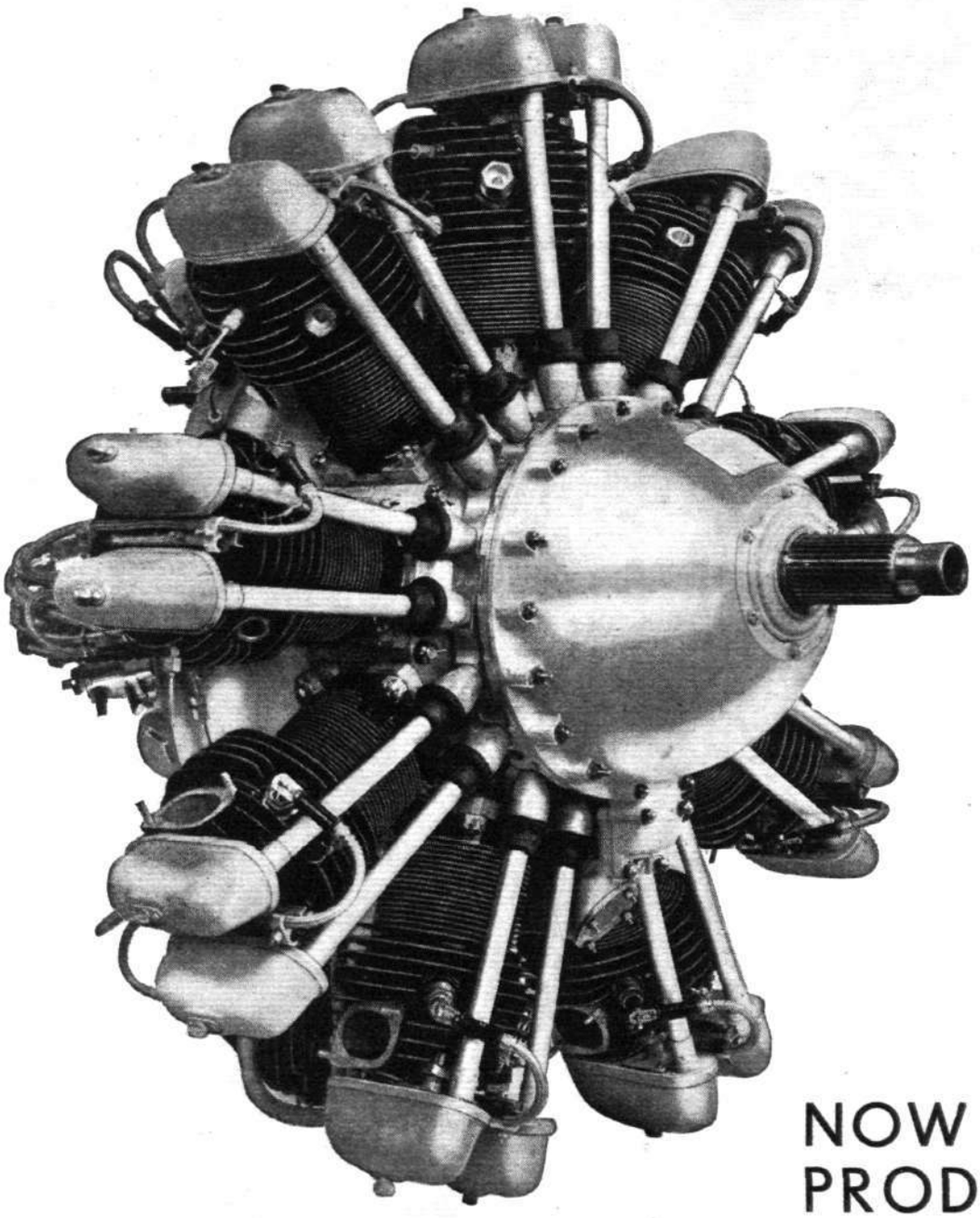
Outlining the way in which progress in technique had paved the way for the direct-control type, the lecturer pointed out



**Four phases of the direct-start Autogiro's "leap" from the ground, shown diagrammatically. The coning angles taken up by the rotor blades are also indicated.**

AIRSPEED ENVOY FITTED WITH TWO
WOLSELEY 185 H.P. A.R.9 ENGINES



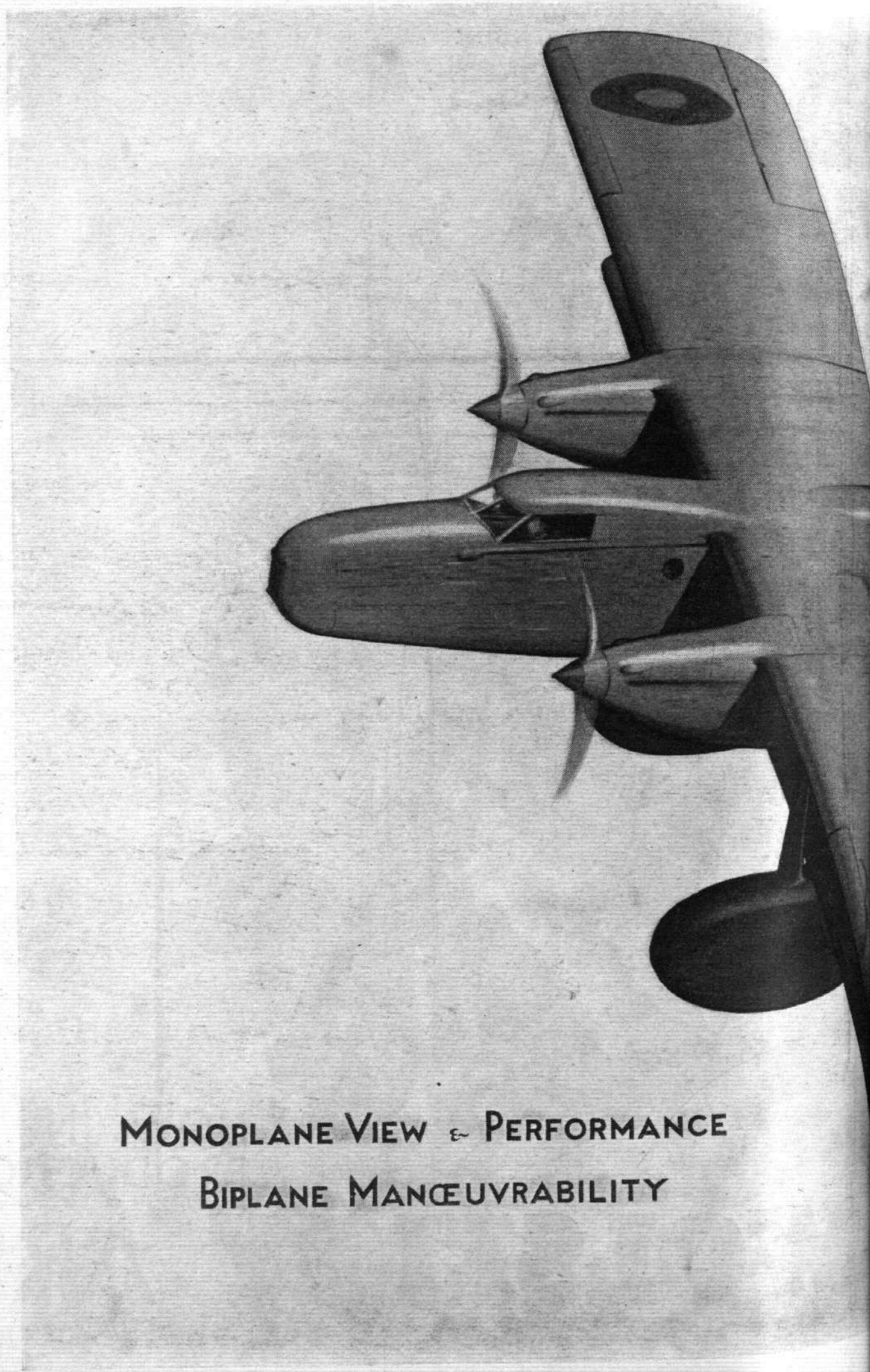



NOW IN
PRODUCTION

# WOLSELEY AR9

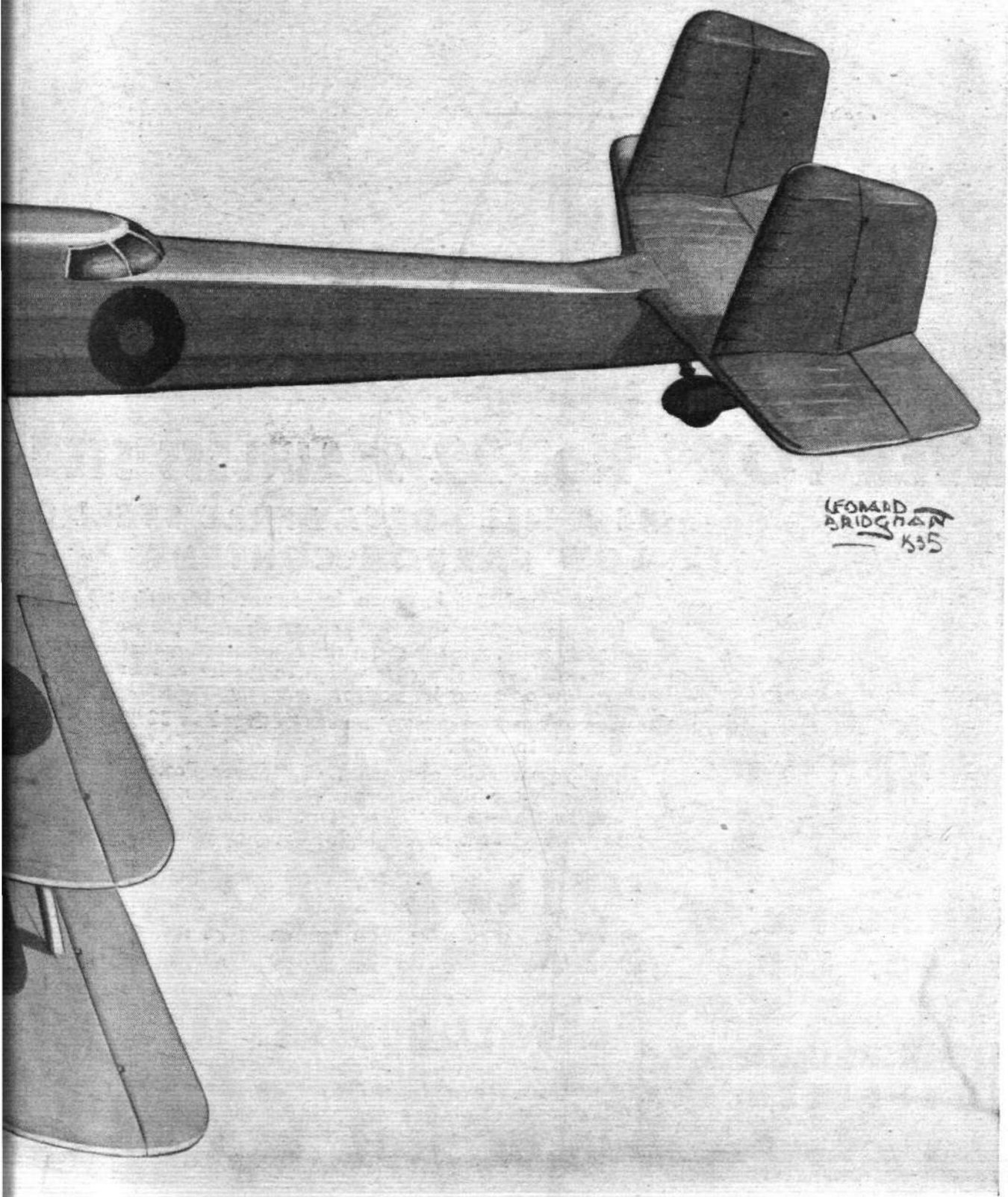
WOLSELEY MOTORS (1927) LTD., WARD END, BIRMINGHAM. *Governing Director:* Lord Nuffield

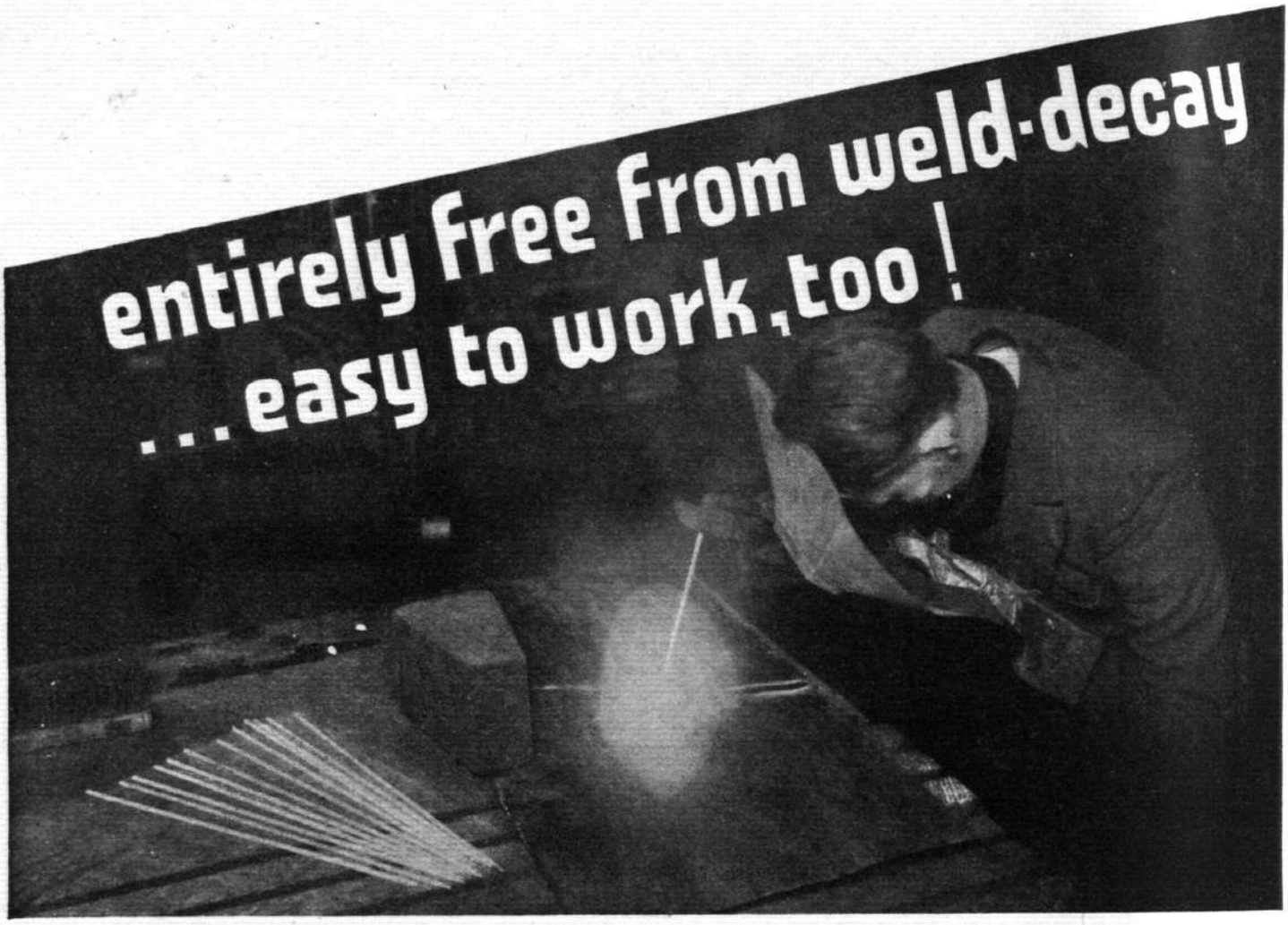
*Kindly mention "Flight" when corresponding with advertisers.*



MONOPLANE VIEW & PERFORMANCE
BIPLANE MANŒUVRABILITY

# "HEYFORD"






# "SILVER FOX" No. 22 STAINLESS STEEL

## IS A WELD-DECAY-FREE STEEL OF LOW CARBON CONTENT

"Silver Fox 22" has two important advantages:

- It is completely free from 'decay' round the weld, and this property is obtained without the addition of material quantities of other alloying elements which might lower its resistance to corrosion or affect its polish.
- The low carbon content makes "Silver Fox 22" more ductile and easier to work.

These remarkable properties of "Silver Fox 22" are made possible by the high-frequency electric process of manufacture. The whole range of "Silver Fox" Stainless Steels is made by this process in the largest high-frequency plant in Great Britain.

THE UNITED STEEL COMPANIES LTD

**SAMUEL FOX & CO. LTD.**

*Associated with*
*The United Steel Companies Limited*

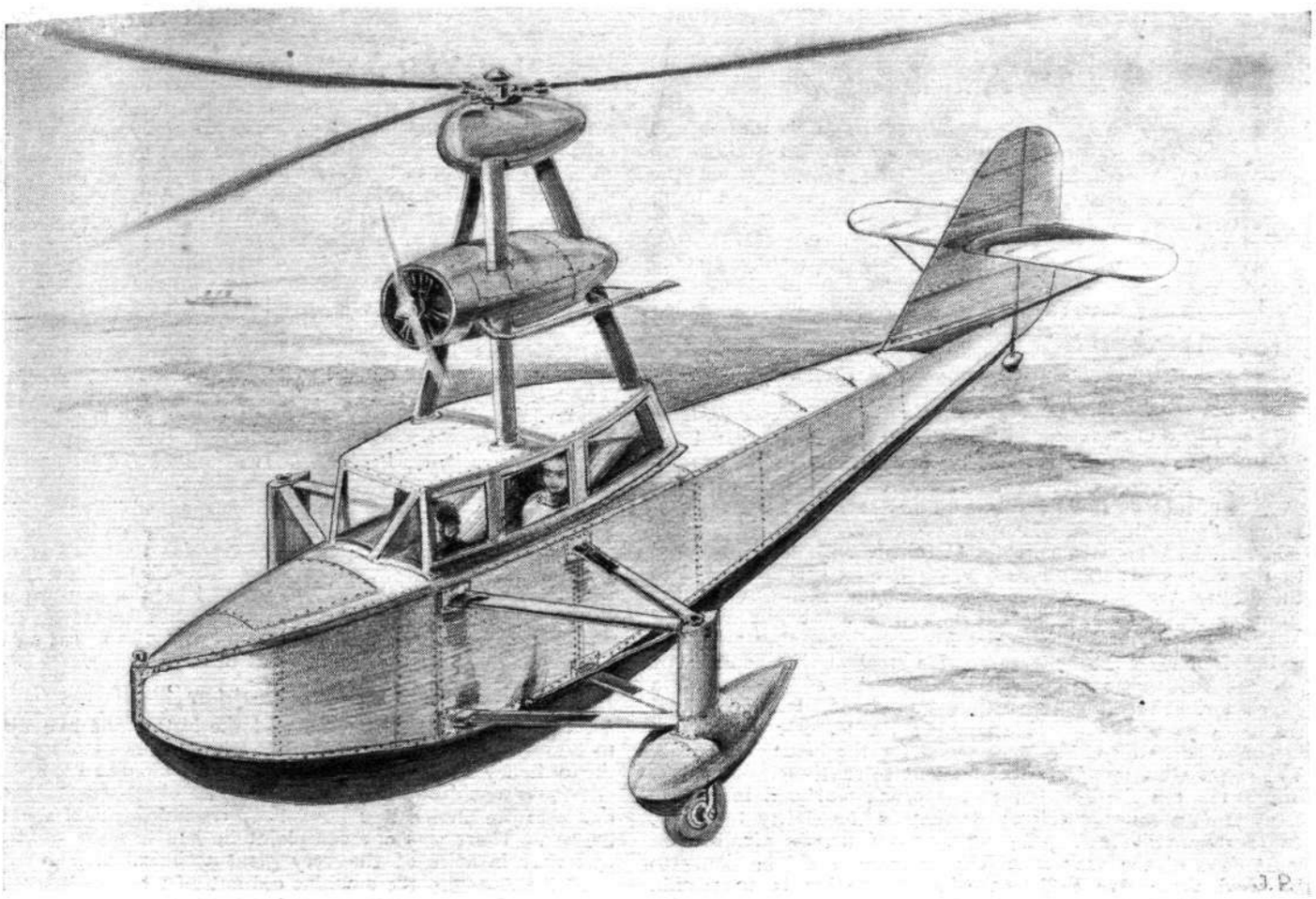
**STOCKSBRIDGE SHEFFIELD**

## "SILVER FOX" STAINLESS STEELS

**CATALOGUE S.F. 157**

*gives you all the facts about "Silver Fox" Stainless Steels, together with useful notes of soldering, welding and brazing, and tables of resistance to corrosion. Write for a copy to the Publicity Department, The United Steel Companies Limited, 17, Westbourne Road, Sheffield, 10.*

F83



The logical type : a *Flight* artist's impression of how the amphibian Autogiro of the future may look. It is fundamentally a flying boat, with outboard floats for stabilisation ; direct take-off will probably avoid the need for steps. The wheels may be drawn up into the floats when operating from water.

how, in much the same way, the perfecting of direct control in its turn made possible the realisation of another idea of the old days: take-off without preliminary run. If by some means the pitch angle of the blades could be reduced to zero during the initial speeding up and the angle afterwards restored to normal, then not only would it take less time to "rev up" the rotor, but it could be speeded up to a higher speed than that corresponding to normal flight. The flywheel effect could then be made use of by increasing the pitch angle, using the energy stored in the rotor for lifting the machine straight into the air without run. The height to which the machine could be lifted in this manner would, of course, depend upon the energy which could be stored in the rotor.

It might have been expected that the incorporation of the mechanism needed to do all this, *i.e.*, set the pitch angle to zero, run up the rotor to a very high speed, declutch the drive to the rotor simultaneously with increasing the pitch angle and opening the throttle to get forward thrust from the airscrew, would have entailed a great deal of extra complication. Far from it. Although he did not disclose all the details, Señor de la Cierva did say enough to indicate that rather than complicate matters the new arrangement tends to simplify them. It was, if we are not mistaken, Professor Bairstow who said at the first lecture ever given by Señor de la Cierva to the R.Ae.S. that it was extraordinary the way Nature seemed to assist the inventor of the Autogiro. He was referring to the way centrifugal pull on the blades carried the lift. In modern times Nature still seems to assist Cierva, or else it is that this brilliant inventor has the gift of being able to scheme out ways and means of getting natural laws to help him. Briefly explained, the variation in pitch angle for the new style of direct take-off is achieved in an almost ridiculously simple way. It will be remembered that in order to enable the separate rotor blades to "overtake" each other to a limited extent during their journey around the rotor hub, vertical hinges are incorporated in the spars. These hinges have merely been tilted with their upper ends pointing outwards slightly. This simple change has been found to do everything necessary.

A few moments' contemplation will show that as a blade swings backward from its hinge, in other words, as it lags behind slightly, the fact that its hinge is sloped will cause the blade to describe part of a cone in space. In doing so the pitch angle is decreased. If the blade overruns its proper position the reverse happens, and the angle is increased.

It is this fact which the inventor has made use of in evolving his direct-start system. When the rotor is started in the normal way by a transmission incorporating clutches, driven by the engine, the rotor blades, owing to their inertia, lag behind the central rotor head, and in so doing decrease their incidence. This lagging behind will obviously be sustained so long as the drive from the engine remains an accelerating force. When the rotor blades have reached the desired speed, the clutch is disengaged, the blades assume their normal position in continuation of the inner end of the spars, and in so doing they return also automatically to their normal pitch angles. This happens instantly after declutching, so that the positive angle at high speed gives rise to a lift sufficient to raise the whole aircraft into the air. The energy stored in the rotor diminishes as the rotor slows down, and ultimately the whole machine would sink slowly to the ground again were it not for the fact that in the meantime the thrust of the airscrew has given the aircraft a horizontal speed sufficient to give autorotation and to keep it in the air.

## *High Speed Forecast*

Concluding his lecture with a few remarks about the future, Señor de la Cierva stated that even with the standard rotor of the production model C.30 it would be possible, by secondary modifications only, to design a new machine clean enough and with enough power to attain a speed of 160-170 m.p.h. The high maximum speed and the direct take-off would enable the Autogiro to compete with both the aeroplane and the helicopter. The latter, even assuming that one were developed which would really work, should, he said, become of doubtful practical interest. Theoretically, jumps of 60 to 100 ft. were possible with the direct style of take-off, but the lecturer thought that for practical purposes an initial height of some 20 ft. would suffice. Direct take-off should offer very interesting and obvious possibilities in the case of seaplanes and amphibians.

Señor de la Cierva finally summed up with the statement

that imminent improvements in various directions would make roof landing a perfectly safe manœuvre, and he could say that they were ready to study from now onwards any form of application involving flying from small platforms or small enclosed spaces.

Films were then shown, including those of various events during the last few years and months, such as picking up messages at Hanworth and landing and taking off on the Spanish aircraft transport ship. The most interesting were, however, those showing in normal and slow-motion the experiments with direct start. The machine seemed to "lift itself by its boot straps," the height reached before steady forward flight was attained being apparently some 8 to 10 ft., and the machine sinking ever so slightly before beginning its normal climb from a height of something like 6 ft.

In order to show that the machine does definitely rise straight up, the chocks were left in front of the wheels.

## The Discussion

Before opening the discussion, the Chairman expressed the thanks of the audience to His Excellency the Spanish Ambassador for being present at the lecture. It was very fitting that he should be there to listen to an account of the remarkable work by this illustrious son of Spain.

Mr. H. E. Wimperis, Director of Scientific Research, referred to the very great compliment which the lecturer had paid to the Royal Aeronautical Society in keeping the secret of the jumping Autogiro until he could divulge it at the meeting of the Society. The direct-start Autogiro inevitably provoked comparison with the helicopter. He recalled that some years ago the British Government offered a prize of £50,000 for a helicopter. Several designs were submitted, but no actual machines were entered. He thought the lecturer might well feel that he had not left very much for the helicopter to do. The direct start was almost equivalent to continued direct lift, because it was the first few inches which mattered in getting away from a rough surface. As regards the ability to hover, the Autogiro did not quite achieve this in still air, but on most days of the year when the machine would be likely to be used there was sufficient wind to enable it to remain stationary in relation to the ground by facing into the wind. In other words, the Autogiro now seemed to do almost everything that the helicopter could do. Reference had been made to the Autogiro seaplane and the advantage of direct take-off. It seemed to him that there must inevitably be some forward speed during the take-off, because otherwise the machine would merely rotate in the opposite direction to the rotor while the latter was being speeded up. He would like to know what approximately would be the speed before the machine left the ground.

Air Commodore J. G. Weir referred to the versatile genius of Mr. Cierva. He wanted to stress the fundamental aspects of Cierva's work, and pointed out that with the rotor a frontal attack was made on the problem of getting a greater mass of air from which to derive lift. He thought it likely that with the latest development in the Autogiro aviation was approaching a new phase. He thanked the Director of Scientific Research for the support which he had given to the Autogiro from its early days.

Lt.-Col. Mervyn O'Gorman admitted that, although the F.A.I. did not recognise records for Autogiros, it had granted Mr. Cierva the very highest award possible. Now that the aeroplane elements had disappeared from the design, he thought there was no reason why autogiro records should not be recognised, and recommended Mr. Cierva to apply again.

Mr. R. A. C. Brie said that he was glad to see the interest shown in the film of the direct-start Autogiro, but the film did not really do the machine justice. One had to see the machine start to believe it, and having seen it one did not believe it.

Mr. E. F. Relf, superintendent of the Aerodynamics Department of the N.P.L., said there was plenty of problems still imperfectly understood in connection with the Autogiro. He recalled that early experiments in the wind tunnel had been unsatisfactory owing to large scale effect, and expressed the hope that in the future it might be possible to carry out experiments in some of the larger tunnels now available. There were many aspects of Autogiro theory which were still not understood by anyone but the lecturer, and he hoped that Mr. Cierva would soon publish his own theories. He would like to know whether Mr. Cierva was of opinion that no dangerous conditions could arise in flight.

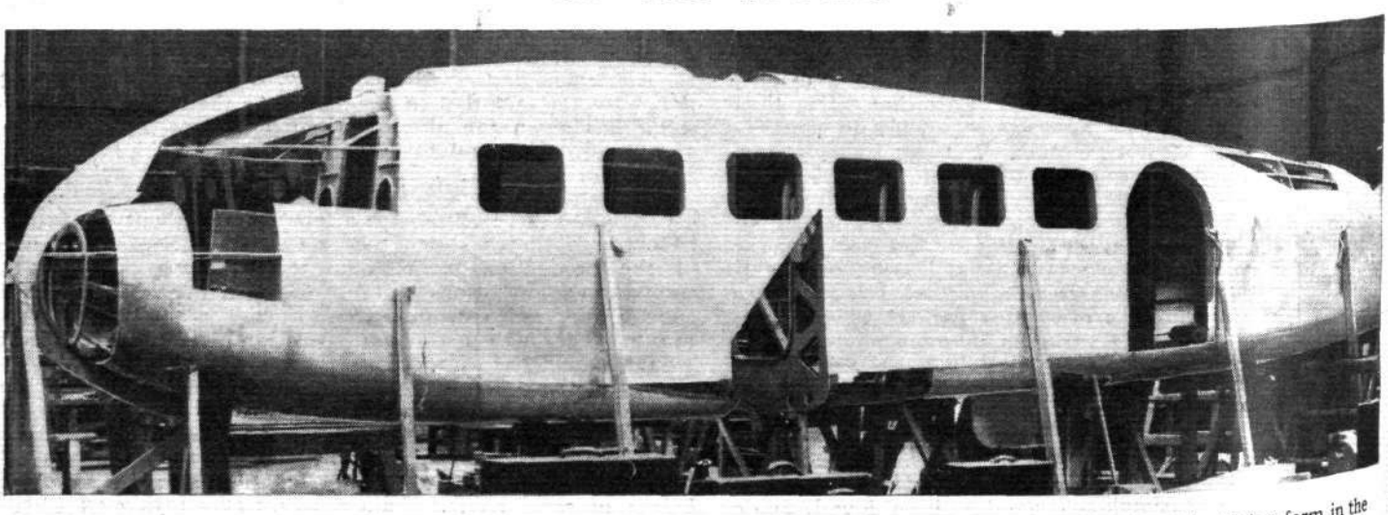
Capt. G. T. R. Hill, designer of the Westland "Pterodactyl," pointed out what he called one very serious omission in the references that had been made to praise the work of the lecturer. Nobody seemed to have realised that Mr. Cierva was a bold and skilful pilot. That had been of enormous importance in developing the Autogiro, and he thought that Mr. Cierva would not have got nearly as far as he had had it not been for the fact that he was himself a pilot.

## "A Grasshopper"

Mr. E. C. Gordon England said the lecture had been a joy to him and other rebellious spirits who were not satisfied with the ordinary commonplace aircraft. He did not know what the Press would be likely to call the new direct-start Autogiro, but the film shown had irresistibly reminded him of a grasshopper. There was one complaint he had to make, and that was that in spite of the very great technical progress made with the Autogiro the machine did not offer the comfort which the type of man for whom the Autogiro was designed expected from an aircraft. He would like to know whether there was any reason why this comfort had not been provided.

Replying to the questions raised, Mr. Cierva said that he thought stationary take-off could be provided in a seaplane if it was considered absolutely essential, but that the speed attained while the rotor was being speeded up would probably not be more than from 10 to 12 m.p.h. In reply to Mr. Relf, he said he was not yet ready to publish his theories. There were indications that in certain conditions the rotor might slow down at very high forward speeds, but so far as they knew at present there was no danger in diving. They had under consideration means to limit the speed at which the pilot could possibly dive the machine. In reply to Mr. E. C. Gordon England, Mr. Cierva explained the relative absence of comfort in existing Autogiros by the fact that hitherto he had been much more concerned with technical problems than with comfort. He thought Mr. England would soon find that in new types a greater degree of comfort would be provided.

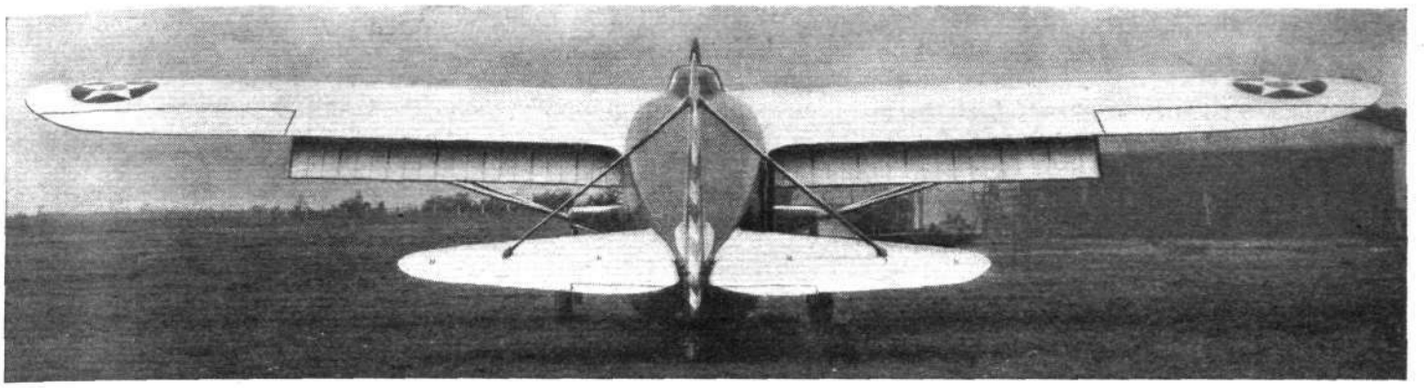
# ON THE STOCKS



**The H.S.T. 10, the new high-speed commercial monoplane described in *Flight* of November 29th, is rapidly taking form in the Blackburn works. The point at which the Duncanson single spar for the wing is offered up into the fuselage will be noticed. Fitted with two Napier "Rapier VI" engines, the machine is expected to have a cruising speed of 175 m.p.h.**

# AN EFFICIENT CARGO-CARRIER

*The American Fairchild C-31 : Useful Load of 5,678 lb. Carried 750 miles at 140 m.p.h. : Single 750 h.p. "Cyclone"*



AERODYNAMICALLY and structurally, there is little in the Fairchild C-31 freight-carrying monoplane that is startling, except perhaps the undercarriage, the wheels of which retract into the bottom of the fuselage; but what can be done by the judicious application to a well-designed aeroplane of such devices as variable-pitch airscrews, flaps and retractable undercarriage is exemplified in the performance figures which are given below. A sample machine has been supplied to the U.S. Army Air Corps.

In order to provide maximum cargo space, a fuselage of approximately square section was adopted. This is made of welded chrome molybdenum steel tubes, with tie-rod bracing in most of the upper, lower and cross panels. Gusset plates, tie-rod lugs, and fittings are welded to the fuselage structure, which is covered with fabric.

Embodied in the "hold" is a cargo chute which permits delivery by parachute of supplies in containers, and a large door (5ft. 10in. by 4ft. 11in.), the threshold of which, when the machine is on the ground, registers with the tail of a lorry. There is almost 775 cu. ft. of unobstructed cargo space, special fastenings being provided on the floor and walls for lashing every kind of load. For military use, six stretchers and a number of chairs for wounded may be carried, or fifteen chairs may be installed, or folding benches built into the wall may be lowered to accommodate fourteen soldiers.

The fin is metal framed and bolted to the fuselage, and the rudder and elevators are of aluminium alloy with metal nose pieces and fabric covering. Trim is effected by adjustable trailing-edge tabs.

Except for steel tube and wire bracing and fabric covering the wings are of duralumin. They embody solid web-type spars with extruded flanges. The leading edge, of sheet metal, reinforced by longitudinal stringers and nose ribs, is riveted to the front spar flanges, top and bottom.

The duralumin-framed Frise ailerons operate differentially, 40 deg. "up" and 15 deg. "down." Zap tyre flaps are fitted. They are supported, with the ailerons, on the rear spar, and may be operated manually or by an electric motor. The lift struts, which run from the wing to a small wing "stub," are of streamline aluminium alloy tubing with strip alloy steel attachment fittings bolted into place.

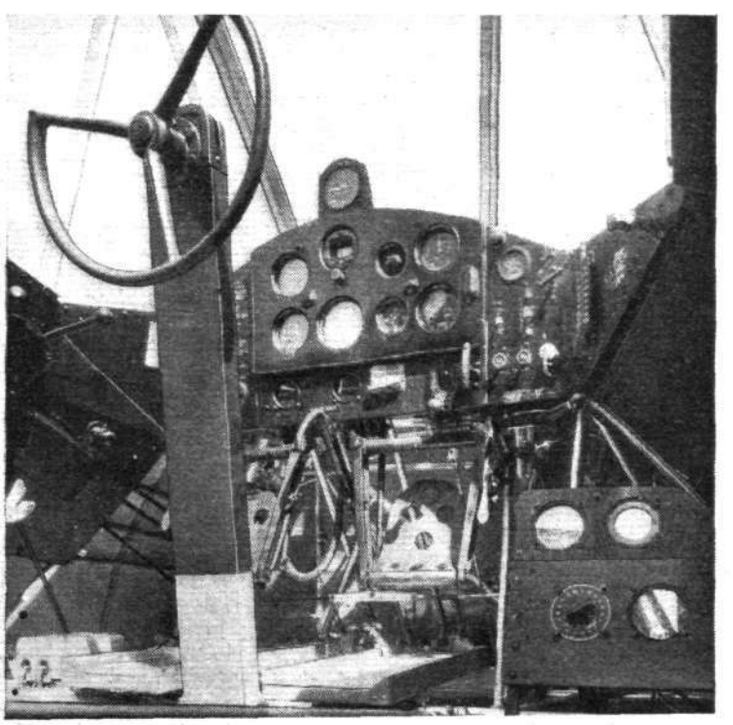
Another interesting feature of the U.S. Army version is the "dishpan" within the N.A.C.A. type cowling of the 750 h.p. Wright "Cyclone" engine, which, incidentally, is of the new R-1820-25 type, and which drives a Hamilton three-bladed controllable pitch airscrew. Data are as follows:—

**Dimensions.**—Span, 75 ft. (*22.86 m*); length, 55 ft. 5 in. (*16.9 m*); height, 15 ft. 10 in. (*4.8 m*).

**Weights.**—Weight empty, 7,322 lb. (*3321.08 Kg*); disposable load, 5,678 lb. (*2575.58 Kg*); gross weight, 13,000 lb. (*5897 Kg.*)

**Performance.**—Maximum speed, 167 m.p.h. (*269 Km/hr*); cruising speed, 140 m.p.h. (*225 Km/hr*); landing speed (full load) 52 m.p.h. (*83.7 Km/hr*); cruising range (full load) 750 miles (*1207 Km*).





The capacious "hold" and the cockpit of the C-31. Dual controls are not fitted. Note the folding wall seats in the "hold," for troop-carrying purposes.

# GOVERNMENT'S £25,000 OFFER

## *To Encourage Production of Medium-sized Commercial Transport Machines: Important Announcement by Sir Philip Sassoon Last Tuesday Evening.*

DURING his speech opening the debate on the Air Estimates in the House of Commons last Tuesday evening the Under-Secretary of State for Air made the important announcement that the Government had decided to offer a £25,000 prize for a competition for an economical medium-sized commercial aircraft.

He revealed this welcome news when discussing the Civil Aviation side of the Estimates. The Americans, he said, had produced fast medium-sized commercial transport machines, and the Government felt that steps should be taken to encourage British manufacturers in the development of this class of aircraft.

### *The Prize*

*"I am able to announce," he said, "that we intend to offer a prize of £25,000 for the best machine produced by a British firm within a stated period of time and complying with certain broad requirements to be formulated by the Air Ministry. Further details will be available later."*

On the subject of the expansion of the R.A.F., Sir Philip, in putting forward the Estimates (which were detailed in *Flight* of March 7), stated that our present position as fifth among the world's air forces was one which could not be allowed to continue. He put France's air strength at 1,650 first-line machines, and that of Russia as probably 2,000. Our own strength was given as 1,020 machines, which would be increased by the end of the year to 1,170 machines. The 1936 programme would bring the figure to 1,313.

Sir Philip remarked, in the course of his speech, that those who admired the work of the Oxford and Cambridge University squadrons would be glad to learn that the Air Ministry had arranged for the formation of a similar squadron of the London University.

He also announced that, as a result of co-operation between the Air Ministry, the Post Office, and Imperial Airways, an Imperial communications scheme had been evolved by which there would be four or five services a week to India, three to Singapore and East Africa, two to Australia and South Africa, and seven or eight a week to Egypt. A scheme of this magnitude would entail the raising of up to £2,000,000 of fresh capital, most of which would go to the provision of new aircraft. The new scheme could not possibly come into operation before 1937.

---

# CORRESPONDENCE

*The Editor does not hold himself responsible for the opinions expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters intended for publication in these columns.*

### "THE POU CLUB"

[3024] Your correspondent Mr. Frost, in your issue of March 14, suggests the formation of a "Pou-du-Ciel League."

I do not know whether there is any serious intent behind his humour, but I should like to inform your members that in view of the correspondence which has reached the Air League on the subject of the "Flying Flea" we are announcing the formation of a "Pou Club" for those who are interested. There is no entrance fee or subscription for members of the Air League, and the Founder, Chairman, Secretary and Committee are at present represented by your humble servant.

The sole object of this Club is to bring together those who are interested in this machine, or machines of this type, to help members to find where to get approved materials and to fight their battles about licences certificates of airworthiness, etc. I shall be happy to send particulars to any of your readers who are interested.

J. A. CHAMIER,
Secretary-General,
Air League of the British Empire.

London, W.1.

### THE STUDY OF BIRD-FLIGHT

[3025] I am conducting an enquiry into the flight of birds, and am at present faced with the problem of speed determination. I am endeavouring to devise an instrument for recording direct measurement of speed, but in the meatime I would welcome any data (addressed to me at the Department of Zoology and Applied Entomology, Imperial College of Science and Technology, South Kensington) from your readers, many of whom must be interested in problems of natural as well as of mechanical flight.

The following list indicates the nature of the information required:—

1. Name of bird.
2. Estimated speed and method of estimation.
3. Height of bird and method of estimation.
4. Direction and velocity of wind in respect of bird's flight, and method of estimation.
5. Date of observation.
6. Name and address of observer.

Observers who are themselves flying at the time of observation are the best enabled to give a close approximation to the true speed, because they are travelling under more or less the same external conditions as the bird. It is for this reason that I am particularly interested in any data of this nature.

I should also welcome specimens of undamaged dead birds.

In conclusion, I would point out that few civil aeroplanes can be flown with safety at sufficiently low speeds for estimating bird speed at all accurately, and that the future of such comparative speed estimates lies rather with the Autogiro.

C. HORTON-SMITH.

London, S.W.7.

### EMPIRE AIR MAILS

[3026] May I be permitted to draw the attention of your readers to the increased air mail facilities which have recently come into force?

Many will already be aware that this Company has recently duplicated its services between England and India and England and Africa, but the mail loads carried on the new services indicate that the public do not fully realise the facilities now available to them, and continue to despatch mail on one day per week only.

There are now two air mails each week from England to Iraq and India and to Central and South Africa. In addition, there is a weekly service between England and Burma, Malaya, the Netherlands East Indies and Australia. The service to Egypt and Palestine now operates no fewer than four times weekly, and in this, as in every case, there is a corresponding return service to England.

It is unnecessary here to detail the actual timings (which may always be obtained from the Post Office or from Imperial Airways) it being sufficient to state that the Empire Air Mail facilities have been approximately doubled, and that in the majority of cases it is now possible to send a letter by air and receive a reply to it in half the time previously necessary. I wish particularly to point out to business men who have been accustomed to posting their African mail for the Wednesday departure and their Indian mail for the Saturday departure, that there are additional mails to India on Tuesdays and Africa on Sundays.

The necessity for a business house to establish a special "air mail day" has therefore, to a large extent, disappeared.

IMPERIAL AIRWAYS, LTD.
*Dennis S. Handover*, Traffic Manager.

# Some British and Dominion Commercial Aircraft fitted with Marconi Equipment

### IMPERIAL AIRWAYS LTD.

No. 1 OPERATING DIVISION.

| | | |
|---|---|---|
| G-ACJJ | AD.41/42 | " Scylla " |
| G-ACJK | AD.41/42 | " Syrinx " |
| G-AAXD | AD.6M | " Horatius " |
| G-AAXC | AD.41/42 | " Heracles " |
| G-AAXE | AD.41/42/52/FG.9 | " Hengist " |
| G-EBLF | AD.6M | " City of Glasgow " |
| G-AACJ | AD.6M | " City of Manchester " |
| G-AAEJ | AD.6M | " City of Coventry " |
| G-AAGW | AD6/AD6N.Rec. | Wessex |
| G-ACHI | AD6/AD6N.Rec. | Wessex |
| *G-ACOX | AD.41/42 | Boulton & Paul |
| *G-ACOY | do. | do. |
| *G-ACRM | AD.41/42/32 | Avro 652 |
| *G-ACRN | do. | do. |
| * | do. | D.H.86 |
| * | do. | D. |
| * | do. | |
| * | do. | |

No. 2 OPERATING DIVISION.

| | | |
|---|---|---|
| G-AAGX | D. | " Hannibal " |
| G-AAI | do. | " Hanno " |
| G- | do. | " Hadrian " |
| G-AA | do. | " Horsa " |
| G-AAXF | do. | " Hele " |
| G-AASP | do. | " Achil " |
| G-ABFA | A.D.18a | S. o " |
| G-ABFB | do. | " Sylvanus " |
| G-ABFC | do. | " Satyrus " |
| G-EBVG | AD. | " City of Alexandria " |
| G-EBVH | do. | " City of Stonehaven " |
| G-AASJ | do. | " City of Khartoum " |
| G-AATZ | do. | " City of Swanage " |

### B.A.N.C.O.

| | | |
|---|---|---|
| G-ACHM | AD.6N | Percival Gull |
| G-ACKU | do. | D.H. Dragon |
| G-ABHO | AD.6M | Ford Tri Motor A.T.5 |
| G-ABEF | do. | do. |

### BIRKETT AIR SERVICE.

| | | |
|---|---|---|
| G-ACAB | AD.6N | Puss Moth |

### PORTSMOUTH & ISLE OF WIGHT.

| | | |
|---|---|---|
| G-ACRF | AD.6N | D.H. Dragon |
| | do. | |

### IMPERIAL AIRWAYS LTD. (NEWFOUNDLAND)

| | | |
|---|---|---|
| VO-ABC | AD.22D | Fox Moth |
| VO-ADE | do. | do. |

### RAILWAY AIR SERVICES (R.A.S.)

| | | |
|---|---|---|
| G-ACVD | AD.41/42/32 | D.H.89, G.W.R. |
| G-ACVZ | do. | do. |
| G-ACVY | do. | D.H.86, L.M.S. |
| G-ACPL | do. | do. |

### QANTAS EMPIRE AIRWAYS (Q.E.A.).

| | | |
|---|---|---|
| VH-USC | AD.37/38/32 | D.H.86 |
| VH-US | do. | do. |
| VH-US | do. | do. |
| | do. | do. |
| -USG | do. | do. |

### SOUTH AFRICAN AIRWAYS.

| | | |
|---|---|---|
| ZS-AFA | AD.37/38/32 | Ju. 52 |
| ZS-AFB | do. | do. |
| ZS-AFC | do. | do. |

### CLELAND AIR SERVICE.

| | | |
|---|---|---|
| G- | AD.6M | D.H. Dragon |
| G-AC | do. | do. |
| * | AD.41/42 | D.H. 89 |
| * | do. | do. |

### SPARTAN AIR LINES.

| | | |
|---|---|---|
| G-ACDX | AD.6M | Spartan Cruiser |
| G-ACSM | do. | do. |
| G-ACVT | do. | do. |
| G-ACBM | do. | do. |
| G-ACTY | do. | do. |
| G-ABXW | do. | Saro Cloud |

### PROVINCIAL AIRWAYS.

| | | |
|---|---|---|
| G-ACKD | AD.6N | D.H. Dragon |
| G-ACBW | do. | do. |
| G-ACDL | do. | do. |

### HILLMAN'S AIRWAYS.

| | | |
|---|---|---|
| G-ACAO | AD.6N | D.H. Dragon |
| G-ACAP | do. | do. |
| G-ACEU | do. | do. |
| G-ACEV | do. | do. |
| G-ACPN | do. | D. |
| G-ACPO | | |
| R | | |

WHY EXPERIMENT? - consult MARCONI

*Fuller list on application.*

MARCONI'S WIRELESS TELEGRAPH CO. LTD

ELECTRA HOUSE • VICTORIA EMBANKMENT • LONDON • W.C.2

1st 1934 I.O.M. MANNIN BEC RACE

1st JUNIOR ACERBO CUP (ITALY) RACE

1st 24 HOURS BOL D'OR RACE (FRANCE)

1st A.R.C.A. C.P. OF AMERICA

1st JUNIOR CIRCUIT MODENA RACE

1st 750 c.c. CAR TO DO 120 m.p.h.

1st GRAND PRIX OF FRANCE (1100 c.c.)

1st 1100 c.c. CLASS KLAUSEN HILL CLIMB

1st AUSTRALIAN GRAND PRIX

1st 1934 ULSTER T.T. RACE

1st JUNIOR SWISS GRAND PRIX

1st B.E.D.C. EMPIRE TROPHY RACE

1st GERMAN GRAND PRIX HILL CLIMB

1st WINTER "100" AUSTRALIA

1st JUNIOR PHOENIX PARK RACE

1st 750 c.c. RACE TIRES MEETING

HOLDS ALL CLASS "H" 100 m.p.h. RECORDS

1st 12 h.p. CAR TO EXCEED 120 m.p.h.

Safety fast!

MG

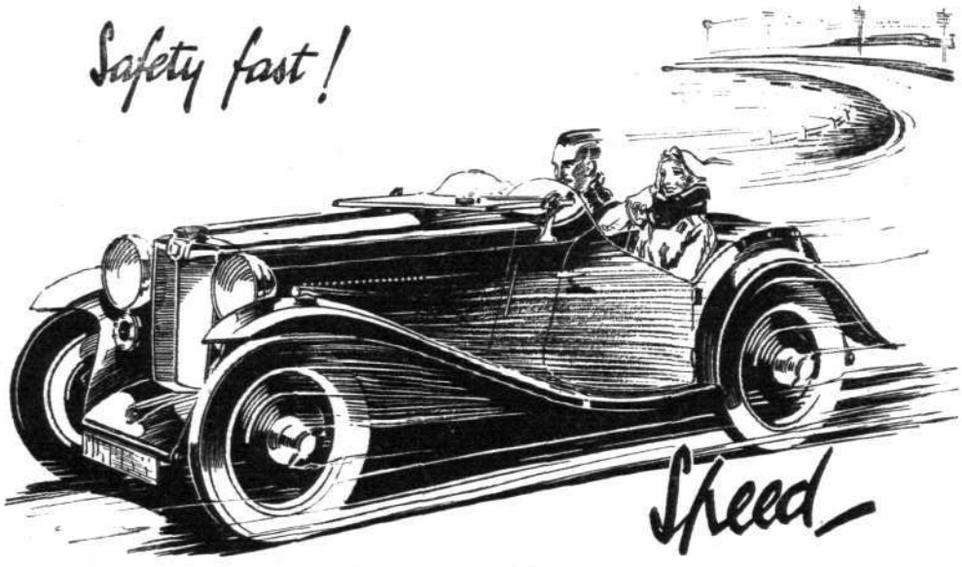
Safety fast!

Safety fast!

MG

Safety fast!

*Safety fast!*



Speed

## WHAT MG RACING SUCCESS MEANS TO YOU—

Throughout the world the M.G. has built up for itself the reputation of being the fastest car of its size one can buy.

Just think, 128 m.p.h. from a 750 c.c. car, 100 miles at 120 m.p.h. from an 1100 c.c. car and of the many racing successes M.G.s have gained! The car you can buy is designed from these successful record breaking and racing cars, and this is the reason why every M.G. is definitely faster, a good deal faster, than any other car in its class. Independent press test reports credited standard models with the following speeds :—

| | Midget | Magnette | |
|---|---|---|---|
| *Light Car* ... | 76.27 ... | 83.3 | m.p.h. |
| *The Motor* ... | 76.0 ... | 82.30 | ,, |
| *Autocar* ... | 74.38 ... | 80.72 | ,, |

Write for literature or better still ask your local dealer to arrange a trial run.

M.G. Midgets from ... ... **£222**
M.G. Magnettes from ... ... **£305**
Triplex glass. Dunlop tyres *ex Works*

**IF YOU WANT SPEED BUY SAFE SPEED—M.G.**

ISSUED BY THE M.G. CAR CO. LTD., ABINGDON-ON-THAMES, BERKSHIRE

# PRIVATE FLYING

# The Objective Reached

**LORD SEMPILL, WITH LOCAL ASSISTANCE, REPAIRS HIS MACHINE AND FLIES TO MELBOURNE AIRPORT FROM HIS TEMPORARY LANDING PLACE ON THE BEACH. THE MELBOURNE CENTENARY CELEBRATIONS IN RETROSPECT**

ALTHOUGH I was disappointed that I had not been able to find the aerodrome after reaching Melbourne from Alice Springs in one day's flying, I was thankful that I had been able to pick out one of the few strips of sand on the beach which were suitable for landing. I had had a long day and was naturally somewhat weary with my struggle through the tea tree "jungle" at the back of the beach, so that I found the period before dawn a lengthy vigil. One wheel of my machine was awash for some time and it continued to sink in the soft sand, so that the "Puss Moth" eventually settled down at an acute angle on the steeply sloping beach.

As the machine tilted more and more I was forced to spend a good deal of time splashing about in the surf endeavouring to right it as far as was possible. Had I landed a few feet farther down the beach I could not have prevented my machine, which had carried me safely almost to my destination, being washed out to sea. As it was, apart from the drenching it received from the salt spray, the damage was confined to the port elevator which was smashed in by an extra strong wave. I was therefore very relieved when dawn came and the tide receded, leaving the machine stranded but clear of the water.

## *Carpenter to the Rescue*

WITH daylight I went to obtain assistance and found that the place where I had come down was only about a hundred yards from a road. After walking about a mile I came to the Marlborough Guest House, and, finding the proprietor, Mr. W. E. Newton, standing on the verandah, I explained my predicament. I must have presented a sorry spectacle and it was not surprising, as he admitted later, that Mr. Newton took me for a "swaggie." My first thought, whilst the proprietress was preparing some breakfast, was to telephone to Melbourne, as they had been expecting me the night before and were naturally anxious at my non-arrival. When sitting down to some very welcome refreshment I listened in to a broadcast announcing the fact that I was missing, but I knew that my telephone communication would be passed on to the authorities concerned. After breakfast, Mr. Newton, having enlisted the aid of the village carpenter, who brought his tools and some thin three-ply wood, we proceeded together with another resident to where the machine lay. The carpenter, Mr. Payton, was a real friend in need, and by covering the complete surface of the elevator with the three-ply to keep it in its proper form, we made a very satisfactory temporary repair. I found, when completed, that the controls were quite normal.

Having lightened the machine by taking out my luggage, which was later taken into Melbourne in a car lent by Mr. A. G. Barrett, a Portsea summer resident and member of the Victoria Aero Club, who kindly lent his assistance, we got the machine into position for taking off. Thus lightened, I managed to get away without much difficulty. I was fortunate indeed to have such willing helpers. Mr. Payton, the carpenter, was most unwilling to take any payment for his invaluable help, and I could not prevail upon him to accept more than the bare cost of the three-ply used. The repair had taken little more than an hour to complete and by 11.30 a.m. I had reached Melbourne.

My first care on landing there was to wash the machine throughly with a hose to get rid of all the salt which had adhered to the fabric and I was then quite ready for a rest after my ordeal of the night before. The airport of Melbourne, which is known as Essendon, is a Government aerodrome suitable for use by all types of aircraft. A focal point of world interest, as the terminus of the MacRobertson Trophy Race, it has a good surface, sloping gently to the S.W., the two dimensions being 700 yards from north to south and 800 yards from east to west. The approaches are fairly good on three sides, but there are wireless masts about 1¼ miles to the west of the ground. Facilities generally are good, and there is a compass swinging base on the aerodrome.

## *A Warm Welcome*

THE welcome I received proved that the great reception accorded to the competitors in the MacRobertson Race had not exhausted their hospitality. Although this air race was only one of the many special events of importance which marked the Centenary Celebrations which had been organised to celebrate the hundredth anniversary of the foundation of the City of Melbourne, it has certainly captured the imagination of the world as few other air events have done. Enthusiasm in Australia was never greater and this was demonstrated by the tremendous crowd which awaited in heavy rain the arrival of Scott and Black at Flemington Racecourse.

It was a great day for that fine patriot Sir MacPherson Robertson, whose enterprise and beneficence made it possible. Sir MacPherson realised the handicap which Australia suffers by reason of its geographical position and great distance from world centres. He was anxious to demonstrate his faith in the possibilities of aviation in drawing the units of Empire closer together by means of more rapid communications. His faith was justified and even his most optimistic estimate of the time that the winner would take—three days—was improved upon.

## *Change of Outlook*

COMPARE this with the five or six weeks, which had always separated Australia from the Mother Country and one obtains an idea of the change of mental outlook which this demonstration of speed has effected. Its repercussions were world wide, but the effect of the race on the airmindedness of the Australian people must have been a great source of gratification to its initiator. Sir MacPherson realised, too, what a challenge his competition was to the British aircraft designers and manufacturers, who had seemed to be greatly handicapped in the first instance. That British enterprise eventually triumphed was an added source of satisfaction to him. Not only has he performed a signal service to his own country, but has been instrumental in enhancing British prestige throughout the world.

Special scientific, commercial and industrial conferences, as well as social and sporting events, had drawn visitors from all over the world during the Melbourne Centenary Celebrations, which have extended over many months. The result of the MacRobertson Race, which occupied such a prominent position in the programme, has therefore impressed at first hand important delegates from all over the world and in so doing has given an added emphasis to a British success which has received such a world-wide press publicity.

***Private Flying***

# FROM THE CLUBS

## *Events and Activity at the Clubs and Schools*

**HOUSEHOLD BRIGADE**

The annual meeting of the Household Brigade Flying Club, which will this year take the form of a night-flying display, is to be held at Heston on Wednesday, May 29.

**NEWCASTLE-UPON-TYNE**

Last Saturday afternoon the club formation, led by the chairman, Capt. J. D. Irving, visited No. 607 (B) Squadron at Usworth. The object of this trip was to hand over the tankard won by the squadron when they defeated the club by 15 points to 9 in a Rugby match recently. A return match is being played early next month.

In spite of foggy conditions several cross-country flights have been made, including trips to Yeadon, Brough and Tranent. Total flying time for the week amounted to 43 hours, of which time 2 hr. 40 min. represents blind flying instruction.

**NOTTINGHAM**

During the current month club machines have flown a total of 30 hours and the membership has increased by eight. No fewer than fifty landings have been made by visitors.

Capt. C. W. Cudemore, M.C., D.M.C., has now been appointed assistant instructor to the club in place of Mr. Roxborough. The club extensions are now completed, and are to be officially opened by the Lord Mayor of Nottingham on March 28, when the club will hold its anniversary ball in the clubhouse.

The club has been presented with a very excellent modern radiogram by Mr. F. Ford, who is himself a flying member.

The Badminton team was victorious last Wednesday, when the players met the Old Nottingonians at home on a dry but cold pitch.

**BROOKLANDS**

During the week ended March 15 Mr. Vreisendorp obtained his "A" licence two days before he was due to return to Holland, and Mr. Scherpenhuysen joined the Brooklands Flying Club. Messrs. Sale and Wilson started a course of blind flying as laid down by the Air Ministry.

On Friday afternoon Capt. Davis and various members of the club went to Lympne for the dinner and dance, and on Saturday he and Ken Waller left Southampton on the *Homeric* for a 28-day cruise, together with members of various other flying clubs.

It is learnt from the College of Aeronautical Engineering that Howard and Maloney have taken their "A" and "C" ground engineer's licences. Maloney is now employed by A. V. Roe and Co. A Heenan and Froude water brake has just been installed at the college at Chelsea. This apparatus is capable of testing engines up to 600 h.p.

**HERTS AND ESSEX**

The next competition will be held on Sunday, April 7, and will be for the "55 Squadron Cup" presented by Mr. S. A. Perrin. In future a competition will be held on the first Sunday of each month. During the past week 47 hr. 45 min. flying was recorded, 22 hr. 30 min. of this representing solo.

**MIDLAND**

Gales prevented flying on Saturday, Sunday and Monday, and flying time for the week amounted to 23 hr. 45 min., of which 12 hr. 40 min. was solo. One cross-country flight was made to Portsmouth. Visitors included Mr. A. Hill, from Walsall, Mr. Barrett, of Henlys, Sir Charles Rose, Maj. Bonniksen, Mr. Sparkes, and a gentleman from Birkett Air Service with a "Cadet."

**CAMBRIDGE**

Marshall's Flying School has added another "Moth" to its fleet, and Mr. Tindall, R.A.F.O., has joined the instructional staff.

On Friday last Mr. Scott passed his "A" licence tests, and on Sunday eleven members of the Civil Aviation Service Corps made flights. There were several cross-countries during the week, bringing the total flying time up to 35 hr. 55 min.

**BRISTOL**

An Avro "Cadet" was sent on Saturday last to the Bristol and Wessex Aeroplane Club for demonstration by Henlys, Ltd. Several members flew the machine.

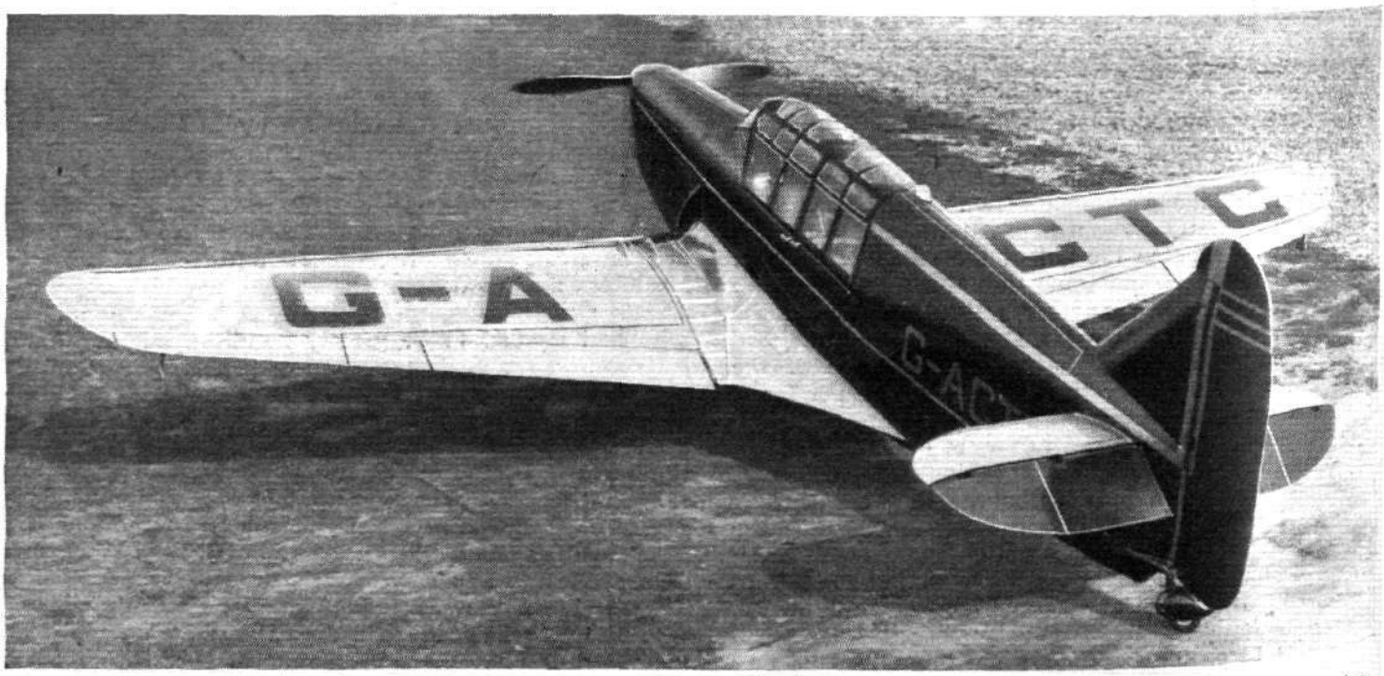
The club is organising a farewell dinner to Flt. Lt. R. W. M. Hall, late chief instructor, who has now joined Imperial Airways. This dinner will be held at the Grand Hotel, Bristol, on Saturday, March 23. Tickets, price 5s., can be obtained from the club office.

Dr. E. A. Mayston has joined as a pilot member.

**NORFOLK AND NORWICH**

The past week-end was one of the busiest for some time. Mr. D. G. Riches has taken his "B" licence. Among the visitors during the week were Mr. G. Watson-Parker and Mr. S. Hansel, two old members, who flew up from Portsmouth in a "Courier," Sqn. Ldr. Soden and Miss M. Hambling, and Mr. A. F. Organ.

On Wednesday evening last Mr. George Gregory showed a number of news reels featuring recent events of aeronautical interest. Mr. C. C. White showed a film of the club's activities. All but ten tickets have been sold for the annual dinner to be held on March 29.




**OUT OF THE CHRYSALIS: An unusually attractive view of Mr. Whitney Straight's Hendy "Heck," out for the first time in its special black and gold finish. This machine was described in *Flight* of February 21.** (*Flight* photograph.)


The Blackburn
"SHARK"
Coastal Defence type aircraft · Wheel or Float Undercarriage

# WESTLAND

DESIGNERS & CONSTRUCTORS OF

# AIRCRAFT

WESTLAND

FIRST OVER EVEREST 1933

THE WESTLAND AIRCRAFT WORKS, YEOVIL, SOMERSET

BRANCH OF PETTERS LTD. BUILDERS OF OIL ENGINES FOR AERODROME LIGHTING

## Specialised Insurance Service

covering every kind of air risk is offered to the aviation industry and the flying public by this recently formed company. Its object is to anticipate the insurance facilities demanded by the rapid development of flying. Its security is evidenced by the twelve leading British insurance companies who have co-operated to bring into being this really influential organisation.

**SUBSCRIBED CAPITAL £500,000**
**of which £250,000 is paid up.**

*Full particulars and rates on application.*

AVIATION & GENERAL INSURANCE CO. LTD.,
**33, Lime Street, London, E.C.3.**

*L. Murray-Stewart, Underwriter and Manager.*

## Private Flying

**YORKSHIRE**

Club flying for last week was about 12 hours, including a flight to and from Brough. The aviation group scheme continues to grow, and already three or four members have commenced their flying training. New members were H. Gledhill and R. H. Wheat—both flying members.

**NORTH STAFFORDSHIRE**

During the fortnight before March 17, 30 hr. 30 min. flying time was put in. A second Miles "Hawk" has been delivered. Mr. R. G. Weighill, R.A.F.O., who has assisted the club in an honorary capacity for the past eighteen months, has accepted the appointment of full-time pilot. Plans are approved for the new clubhouse, which it is hoped will be ready before the end of April.

**READING.**

Dr. Rebello, of Portugal, is still waiting with his passenger, the Duc de Broganca, to leave for his own country in a "Hawk Major."

Mr. Errol Shapley has gone solo with the Reading Aero Club, and Mr. Forsyth has taken delivery of one of the latest "Hawk Majors."

A Miles "Falcon" has been shipped to Hong Kong, and Mlle. Brascu, the Roumanian parachute expert, has put in no less than 14 hours' solo in her "Hawk."

**WITNEY AND OXFORD**

The date of the official opening of the club and of the garden party has been fixed for June 8. Sir Alan Cobham's National Aviation Day Display will be given at the aerodrome on Tuesday, April 16.

Witney Aerodrome will be a turning-point in the race for the S.B.A.C. Challenge Trophy, which is being organised by the Bristol and Wessex Aeroplane Club, and which will be held on Saturday, June 15.

During the past week 8 hr. 55 min. dual and 4 hr. 55 min. solo were recorded.

**HANWORTH**

Extensions to the clubhouse are going up fast at Hanworth, and before long the accommodation will be greatly increased. Even now the life of the club goes on with little or no interruption, and at week-ends in particular there is always a great deal of activity. One of the latest developments is the formation of a dance band by the members.

Aircraft received during the week for C. of A. renewal include Maj. Holden's "Leopard Moth" and Mr. R. Everett's "Puss Moth."

New members are Miss Bailey, Messrs. J. Grose, J. L. Ogilvie, J. Rush and M Bruce. Barron Baner, of Sweden, has passed his "A" licence tests, and Mr. N. B. Littlejohn has bought a "Klemm." Flying time for the week amounted to 25 h. 40 min

**NORTHAMPTONSHIRE.**

The fine weather of the week-end encouraged many of the members who have been hibernating to resume their flying, and a considerable increase in flying hours was shown last week. Miss U. Waldron completed her tests for an "A" licence last Wednesday, and Mr. Norman Manby joined the club.

**CINQUE PORTS**

Everyone will agree with Lt. Col. F. C. Shelmerdine, who, when replying to the toasts of the guests at the annual dinner of the Cinque Ports Flying Club last Friday, gave it as his opinion that that club has done more to foster international relationships among private owners than any other. Col. Shelmerdine also said that a good way to judge a club was by the amount of flying it did and, therefore, by the amount of subsidy it earned. In the year ended March 31, 1934, the Cinque Ports Club earned over £1,000, and up to December 31, 1934, they had already earned the maximum of £1,200, although there were three more months of that financial year to run. He congratulated them on being the first club on the list from this point of view and asked, also, for a greater measure of local support for the Club, pointing out its value to Folkestone and the surrounding district.

Mr. Eric Davis, the manager, made the important announcement that Lord Reading, as Lord Warden of the Cinque Ports, had accepted Presidency of the Club. Mr. J. P. Morkam, Air Ministry control officer at Lympne, Lord Justice Romer, Mr. Noel Coward, and Mr. C. W. A. Scott, had all become Vice-Presidents. With regard to the progress of the Club, he said that the membership at the end of December last year had risen to 271, of which 163 were "A" licensed pilots and 14 "B" licensed. During last year 39 "A" licences had been gained by members.

Others to speak were Mr. Ken Waller, the Club's second instructor, who by virtue of his performance in the England-Australia Race was invited to the dinner as a guest, and Mr. C. W. A. Scott, who was also one of the guests of the evening.

After the dinner those present were entertained in a manner which they obviously appreciated by Georges Seversky and two friends, Mlle. Hildegarde and Mr. Dima Oussoff, whom he brought over from France with him in his Caudron "Phalene." This is the same machine which Capt. Challe used in the Round the Oases competition in Cairo the Christmas before last, and "Georges," a staunch supporter of the club, uses this machine to fulfil his cabaret engagements all over Europe.

Mr. Ken Waller has now left on his holiday and Mr. Rea, from Hatfield, has started his job as assistant instructor. New members joining the Club were Messrs H. E. Waring and S. A. T. Edwards. Flying time for the week, dual and solo, amounts to seventeen hours.

---

### See Morocco at Easter

The Casablanca Aviation Club—"*Les Ailes Marocaines*"—is organising a tourist rally during the Easter holidays. At each lap during the tour a cup or trophy will be offered to the pilot having passed the line closest to the time allotted to him at the start.

The first object of this event is to allow a pilot to make a tour of Morocco in a minimum time with a minimum expense. Visitors will be present at native parties, will take part in hunts and fishing parties, will visit the Souks and will fly over magnificent country.

All information and pamphlets will be sent upon request by *Les Ailes Marocaines*, 9 Rue de l'Eglise, Casablanca, and, as the entries are limited, those interested should write at once.

### Another Long-distance Instructional Flight

The idea of running another instructional flight to Europe has been under consideration by the Bombay Flying Club for some time, and one will probably be made early in June. There is every chance that a number of up-country pilots will join the flight.

If arrangements can be completed, it is expected that Mr. A. C. Gazdar, the club's pilot instructor, will be in charge.

### A Summer Gliding Camp

The London Gliding Club has arranged a special gliding course, open both to members and non-members, from August 1 to August 14 at an inclusive fee of 12 guineas, which will include instruction, use of machines, sleeping accommodation, breakfast, lunch, tea and supper each day, and membership of the Club throughout the period of the camp. The camp will, of course, be at Dunstable, from which so many highly successful and record flights have been made. The fleet of machines available for use includes primary and secondary trainers, intermediate, high efficiency and two-seater sailplanes. Mr. G E. Collins will be chief instructor for the Club.

The closing date for applications for this course is May 15. During the camp the organisers accept full responsibility for damage to the machines and for damage to third party, but accept no responsibility for damage or injury to camp members. Application for membership forms should be made to the Secretary, London Gliding Club, 13 Victoria Street, London, S.W.1.

### Finish

Naturally, when a colour scheme for an aeroplane has been designed by a famous artist it is only reasonable that great pains should be taken with the finish. Little fault can be found with that of Mr. Whitney Straight's Hendy "Heck," which was given a first airing in its attractive black and gold scheme last Friday. The combination is not an easy one, and both Mr. McKnight Kauffer, the designer, and the Cellon Company are to be congratulated.

Some eight or nine coats in all were used with the Cellon "Z" system, in which three or more coats of red dope, rubbed down between coats, are followed by pigmented dope coats and transparent coverings. Before the last coat the surface is rubbed down. The whole of the work in this case was carried out at a temperature of 40 deg. in the shops of the Aircraft Exchange and Mart at Hanworth. A photograph of the finished "Heck" appears on p. 314.

# COMMERCIAL AVIATION

## AIRLINES — AIRPORTS



Mrs. S. M. BRUCE, the wife of the Australian High Commissioner, christens one of the Monospar S.T.12's which are bound for the Commonwealth. In the group may also be seen the Rt. Hon. S. M. Bruce, Mr. and Mrs. Gordon England, Mr. Whitney Straight, Mr. H. J. Steiger (Monospar technical director), and Flt.-Lt. H. M. Schofield. (*Flight* photograph.)

## CROYDON

### *Imperial Airways' New Machines : Congestion Above and Below : The Question of Hangar Space : Rollasons Busy*

THE two Avro 652 machines, *Avalon* and *Avatar*, have now been delivered to Imperial Airways. One was flown over from Woodford by Mr. "Bill" Thorne, who renewed many acquaintances at Croydon. There has, in fact, been much activity in connection with the new Imperial machines. I understand that Captain Horsey has flown most of them and that various heads of departments have been taken for trial flights. Captain Percy took his ticket on the Avro 652 and immediately afterwards on the Boulton Paul *Boadicea*, then stepped straight into *Heracles* and took off with the 12.30 Paris service.

The general opinion of the pilots is that the new aeroplanes are pleasant to fly—preferable indeed to the bigger types. It is curious, though, that the veteran K.L.M. pilots report the big F36 to be one of the nicest machines of the fleet to handle, and prefer it to the smaller aeroplanes.

Considerable excitement was caused last week when a lady imported two dogs into England *via* Croydon without, it was alleged, the necessary import licence. The dogs were taken away by the police and both the lady and the company on whose aeroplane the animals arrived became liable to a fine. Some time ago there was a fuss because some young lions were thus imported.

The regulation, though irritating, is sound and has practically done away with rabies in this country.

An Airspeed "Envoy" was demonstrated here last week to a group of distinguished people, amongst whom was Wing Cdr. Meadows, of Railway Air Services. The first Swissair Douglas arrived on Saturday afternoon, piloted by Capt. Ackermann. Its registration is HB-ITE.

Traffic congestion on both the ground and in the air is now the order of the day at Croydon. The hangar accommodation is far too small, and the number of machines requiring shelter continually increases. Imperial Airways completely fills one hangar and even overflows. Other firms have guaranteed space for so many machines in the other hangars. When a machine of company A is at the back of a hangar, with aeroplanes belonging to firms B, C, and D in front of it, the fun begins. What does A do if he wants his machine for an early service? He must not tamper with other people's aeroplanes nor wheel them out into the rain. The Air Ministry cannot take that responsibility either, and naturally B, C, and D dislike bringing their machines out to give A egress. Anyway, if B is a large machine right in front, it is a bit of luck if its owner is to be found when wanted. Machines such as the *Heracles* and Fokker 32 take the full span of the hangars with a few feet only to spare. The latter has a wing span of 110 ft.

Another vexed question is: What constitutes space for one aeroplane in a hangar? Low wing monoplanes and biplanes cannot be crowded, but a high wing monoplane, of similar size, paying the same rental, can have all sorts of smaller fry placed close up to the fuselage. As in the case of several other points put to the authorities years ago, no definite ruling has been received concerning this.

Import of merchandise in passengers' baggage is frowned on by H.M. Customs unless demonstrably travellers' samples. Some £40,000 worth of pictures were brought in in trunks recently, and the importer became liable to a fine of 1 per cent. of the value. He said that the company had told him that he could bring them as personal luggage. This was so—but the company did not know what was in the trunks.

Olley Air Service continues to be busy. Capt. Olley is away on a Mediterranean air cruise, and Mr. "Bill" Ledlie left on Saturday last for an extensive tour of the Continent.

Since opening the new Hull service Provincial Airways have noticed an increase of freight, such goods as typewriters and printing blocks being now regularly transported between the various provincial towns and Croydon.

Rollason Aircraft Co., Ltd., suffers from a spring rush of work. Last month was a record for sales, and this month looks like beating all records.

The firm is very busy in "Dragon" overhauls, and the engine shops are full of "Gipsy" engines undergoing major overhauls. Two wireless sets have just been fitted to machines. Early next week Mrs. Mollison's Beechcraft should be flying.

It is Capt. Rollason's ambition that his company should become the "garage of the air". The company, besides the de Havilland agency, incidentally acts as agent for most first-class components.

A. VIATOR.




# A GOOD "LANDING"

## SECOND-HAND BARGAINS

**208.** D.H. MOTH. Gipsy I Engine. C. of A. 12 months. Total Hours 618. **£370**

**202.** MONOSPAR. 2 Pobjoy 'R' Engine. C. of A. 12 months. Total Hours 158. Blind Flying. **£750**

**217.** STANDARD HAWK. Cirrus III Engine. C. of A. December. Total Hours 75. Many Extras. **£395**

**226.** D.H. PUSS MOTH. Gipsy III Engine. C. of A. July, 1935. Total Hours 650. Blind Flying. **£575**

**227.** D.H. MOTH. Gipsy II Engine. C. of A. September, 1935. Total Hours 520. Many Extras. **£395**

**AIRCRAFT DISTRIBUTORS LIMITED**

*Agents for Hawk Aircraft*

53a, **SHAFTESBURY AVE., W.1.** 'Phone: Gerrard 7222

## S. & M. ALTIMETERS




**SLOT ILLUMINATED, LANDING, SUB-STANDARD TYPES, ETC., IN REINFORCED MOULDED CASES.**

*FULL PARTICULARS ON APPLICATION*

**SHORT & MASON** LTD.

THE INSTRUMENT HOUSE

*AVIATION & SCIENTIFIC INSTRUMENT MANUFACTURERS*

**WALTHAMSTOW, LONDON, E.17.**

# PITMAN'S AVIATION BOOKS

***Every airman and air enthusiast should have a copy of Pitman's Latest Catalogue of Aviation Books. It contains full details of 40 books dealing with almost every branch of aeronautics and aviation. If you do not already possess a copy, send to the publishers immediately***

*LATEST PUBLICATIONS*

## HOW TO FIND YOUR WAY IN THE AIR

By G. W. FERGUSON.

This book shows you how to find your way about in an aeroplane. It describes the navigation instruments and how to use them and enables you to determine your position and to plot and follow a course, etc. 80 pp. Illustrated. **3/6** net.

## STRATOSPHERE AND ROCKET FLIGHT

By CHARLES G. PHILP.

All followers of aviation who are watching Stratosphere flight experiments should read this fascinating book. It gives the full story of recent achievements and future possibilities in Stratosphere and rocket flight and describes what the rocket itself will be like. 112 pp. Illustrated. **3/6** net.

## THE ROYAL AIR FORCE

By T. STANHOPE SPRIGG.

If you are interested in the careers offered in the R.A.F., now is the time to read this book. It tells you all about the different posts that are available and gives full details about prospects and remuneration and methods of application. 130 pp. **5/-** net.

## AIR LICENCES

**By T. Stanhope Sprigg.** This book contains information about the twenty-one Civil Licences and Certificates. 130 pp. **3/6** net.

## LEARNING TO FLY

**By Frank A. Swoffer, M.B.E.** This is the recognised instruction manual for everyone taking up flying. 158 pp. Third Edition. **7/6** net.

## THE AUTOGIRO AND HOW TO FLY IT

**By Reginald Brie.** The Second Edition of this valuable handbook describes the Autogiro, including the "wingless" type, and discusses its possibilities. 124 pp. **5/-** net.

## GROUND ENGINEERS' TEXTBOOKS

In Six Volumes. Each in Medium 8vo.

**Aero-Engines ("C" Licence). 2/- net. Instruments. 5/- net.**
**Aero-Engines ("D" Licence). 3/6 net.**
**The Rigging, Maintenance and Inspection of Aircraft. 5/- net.**
**Inspection of Aircraft after Overhaul. 3/6 net.**
**Electrical and Wireless Equipment of Aircraft. 5/- net.**

**PITMAN** Parker St., Kingsway, W.C.2

## HIGH SPEED DIESEL ENGINES

*for AUTOMOTIVE, AERONAUTICAL, MARINE, RAILROAD and INDUSTRIAL USE*

By P. M. HELDT, Editor of "Automotive Industries"

●

A NEW BOOK ON RECENT RESEARCH AND CURRENT DESIGN

THE book is a condensed review of research work on High Speed Diesel Engines. It has been written primarily to help those engaged in the design and experimental development of this type of engine, as well as pioneer operators of vehicles equipped with Diesel Engines.

Demy 8vo, 312 pp., comprehensive index, numerous charts diagrams and illustrations from photographs.

PRICE 20/- Net. By post 20/6

*Obtainable from*

ILIFFE & SONS LTD., Dorset House, Stamford St., London, S.E.1

## An indispensable Guide for Owners and Drivers

THE

## AUTOCAR HANDBOOK

***Twelfth edition, completely revised and largely rewritten***

●

"THE AUTOCAR HANDBOOK" gives a popular explanation of cars and motoring as they exist to-day presenting mechanical details clearly for the non-technical reader.

Recent innovations and improvements including pre-selective gears, synchro-mesh gears, the fluid flywheel, petrol pump feed, quick start carburetters, Startix switch and many others are explained and illustrated.

The owner-driver will find "THE AUTOCAR HANDBOOK" a great help in the wise use and proper care of his car. It covers the whole subject, and is in fact an up-to-date elementary textbook of motor car construction and design.

*228 pages, 301 illustrations*
*Price 2/6 net. By post 2/10*

*From all leading Booksellers or direct from the Publishers*

**ILIFFE & SONS LTD., Dorset House, Stamford Street, LONDON, S.E.1**

## AERONAUTICAL PLYWOOD

**MALLITE AND APPCO.**

**Manufactured by the AERONAUTICAL AND PANEL PLYWOOD CO., LTD., 218-226, KINGSLAND ROAD, LONDON, E.2**

IS ENTIRELY MADE WITH BRITISH MATERIALS AND ACCORDING TO THE BRITISH AIR MINISTRY SPECIFICATION 4.V.3. A GOVERNMENT APPROVED INSPECTOR SUPERINTENDS THE MAKING—TESTING—AND OFFICIAL STAMPING OF EVERY BOARD.

**OUR PLYWOOD IS THE BEST QUALITY IN THE WORLD FOR**

**STRENGTH**

**AND**

**RELIABILITY**

**TELEPHONE: BISHOPSGATE 5641 (4 Lines).**

## MAGNUMINIUM

SPECIFIC GRAVITY 1·82

in the form of

FORGINGS
EXTRUSIONS
STAMPINGS
CASTINGS
ETC.

MCP

MAGNESIUM CASTINGS & PRODUCTS LIMITED
BUCKINGHAM AVENUE, SLOUGH
TELEPHONE: SLOUGH 822 TELEGRAMS: MAGNESIUM, SLOUGH

# HESTON

## *Floodlight Demonstrations : A Charter Night : Neon Sign Flying : A Dragon in Knightsbridge*

ON March 8 a new 4½ kW. Chance floodlight was demonstrated at Heston. It is known as the Three-lamp Reflector Floodlight and is of a type similar to three which have already been ordered. It is a three-phase light without transformers, each unit of 1½ kW. operating off the mains. Each phase is fitted with a separate bulb and consumes an equal amount of power, thus obviating the possibility of placing an unbalanced load on the mains. The floodlight is enclosed in a galvanised iron housing and is supported on rollers running on curved tracks, enabling it to move through a horizontal angle of 60 deg. An obstruction light is mounted on the top. The floodlight has a range, straight ahead, of 2,800 ft., at which distance it gives 0.15 foot-candle-power, the minimum output required by the Air Ministry. Capt. V. H. Baker has given flying demonstrations by its light.

At 11 p.m. on Tuesday night, Capt. Birkett left with Press photographers for the scene of the petrol tank fire at Southampton Water. Four hours later Mr. E. H. Newman, another Birkett pilot, left for Paris with a load of newspapers giving an account of an interview with M. Venizelos. The taxi firms at Heston have been booked to capacity taking pressmen to the scene of the railway smash and blockage on the Manchester line.

Mr. Whitney Straight has been appointed to the Board of Air Commerce, Ltd., which is to carry out neon sign flying. A new Monospar was delivered to this company last week, and this will be used for charter and neon sign flying. The framework which supports the neon tubing on the underside of the wings is easily removable when the machine is required for other purposes. Contracts for neon sign flying have been secured by this firm from the Ramsgate Town Council and the Gaumont-British Company.

A man who says he saw a dragon in Knightsbridge in the small hours of Thursday morning was not necessarily intoxicated. In the dead of night the Airwork lorry and trailer transported a D.H. "Dragon" belonging to Jersey Airways from Heston through the streets of London to their offices at the Victoria Coach Station. Police co-operation was willingly given. Throughout Thursday the machine was on show at the Victoria Coach Station.

Airwork has been approved by the Air Ministry for the overhaul of magnetos, and has installed a specially designed plant for this purpose. A stock of all popular types of magnetos for service requirements is held, and immediate exchanges and replacements are effected if necessary, so that an aeroplane can be flown on a loaned magneto while one of its own is being overhauled.

---

### *Doncaster—Croydon*

On Tuesday of last week a daily service between Doncaster and Croydon was started by Crilly Airways, using a D.H. "Dragon" previously owned by Midland and Scottish Air Ferries. The service leaves Doncaster at approximately 9 a.m. and leaves Croydon at 4.30 p.m.

### *With Modern Equipment*

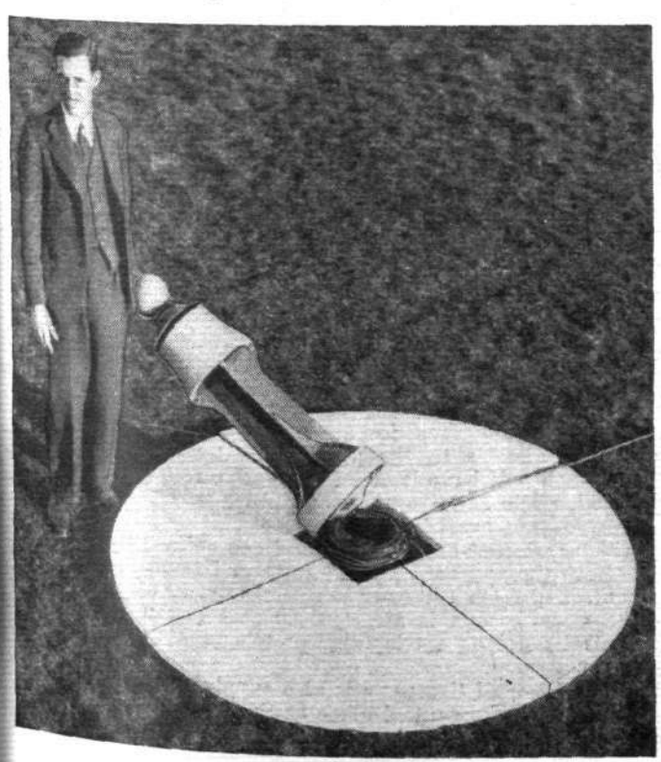
Douglas machines are now in full service on Eastern Air Lines routes between New York, Chicago, Miami and New Orleans. Day and night nine-hour services run between New York and Miami, with north and southbound runs connecting Chicago, Atlanta, Jacksonville and Miami, and another 8½-hour "New Orleans Flyer" from New York, through Washington and Atlanta to New Orleans. The Curtis "Condors" are now used for a stopping service over this route.

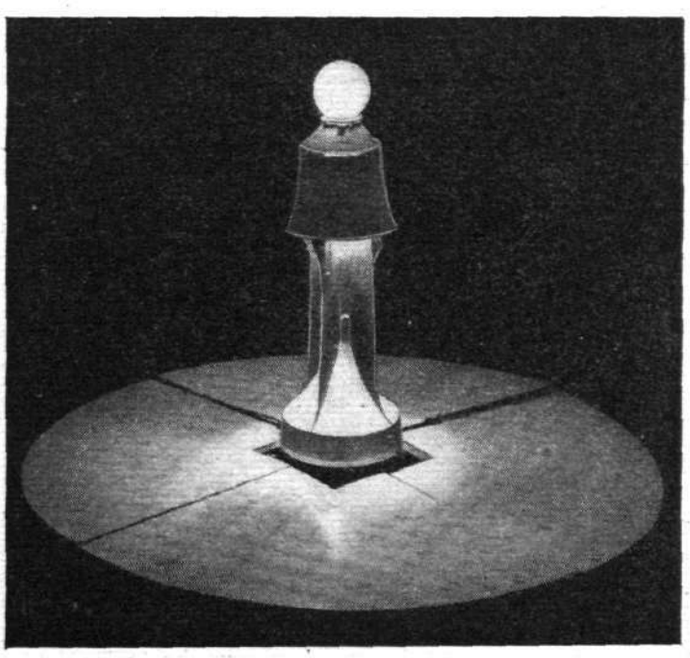
With the introduction of Lockheed "Electras" on the Aerovias Centrales services more than three hours have been lopped off the Los Angeles-Mexico City services.

### *Something New in Boundary Lights*

In the last two issues of *Flight* the general principles of, and a pilot's opinions on, the "Pillar of Fire" boundary beacons, in experimental use at Stapleford Abbotts, have been given. Below are photographs which indicate more clearly the useful characteristics of the lights, which are produced by the Cardiff Foundry and Engineering Co., Ltd.

The actual marker light is the orange-red globe at the head of the pillar, while below is a lamp and parabolic reflector, protected by a wire mesh guard, directing a circle of light on the white plywood base. This area of light, with the marker light, absolutely distinguishes the beacon from any other local illumination, and the vertical distance between the globe and the base will give an incoming pilot a very good idea of his relative position. The rounded inner base of the pillar simply rests in a shallow cup, and connection is made by two spring-loaded contact pins. If the pillar is touched either by a tractor or a taxying aeroplane the contact is immediately and completely broken. In due course, it is suggested, it will be possible to arrange the pillar so that it rights itself.





**"PILLARS OF FIRE": One of the new boundary lights at Essex Airport showing (left) the way in which the pillar, as it is moved, breaks its own contacts and (right) the effect as seen at night.** (*Flight* photographs.)

***Commercial Aviaiton***

# P. S. AND I.O.W. AVIATION PLANS

## *New Airspeed Fleet : Lower Fares and More Frequent Services : Another Route Planned*

AS foreshadowed in *Flight* of March 7, the P.S. and I.O.W.A. services will be speeded up with the fleet of new Airspeeds, comprising both "Lynx Envoys" and "Lynx Couriers" which are shortly to be delivered. All these machines are being equipped with wireless, the "Couriers" carrying Marconi A.D.6N. sets and the "Envoys" carrying the new Marconi long-range A.D.41/42 sets. All aircraft will be equipped with Sperry artificial horizons and directional gyros and with Reid and Sigrist turn and back indicators.

The Company is likely to start a new route on May 1 of considerably greater length than any other undertaken, though details cannot yet be published. The network of ferry services between the mainland and the Isle of Wight will be completed by a new link from Southampton to Ryde and Shanklin, commencing on April 15. The Island Air Express service will again run from Heston. The scheduled time between Heston and Ryde will be reduced from 40 minutes to 30 minutes, and the "Envoys" will be equipped for this route as eight-seaters. The time-table will provide two basic services a day from Monday to Thursday, three services on Friday, five on Saturday, and four on Sunday, with supplemented services for Easter, Whitsun and the Jubilee Bank Holidays. Cheap day returns will be available from London on Monday to Thursday, and from the Isle of Wight on Sunday, Tuesday, Wednesday and Thursday. On Saturdays a special lunch-time service will be run, with a late service from the Island at 8.25 p.m. on Sundays and Bank Holiday Mondays.

There will be four services on the Bournemouth-Isle of Wight ferry from April 15, increasing to five after June 7. The service will be operated with wireless-equipped "Couriers," and the fares are being reduced. As before, two of the services will connect with Western Airways' services at Bournemouth to and from Bristol and Cardiff. The new service from Southampton and the Portsmouth-Shanklin service will also be operated with "Couriers." Passengers will not change at Ryde, and the fares will be reduced.

On the Portsmouth-Ryde Ferry there will be six services a day from April 1 to April 17, and the service will be hourly from April 18 to June 6, and half-hourly from June 7. As soon as the Portsmouth airport is lighted reciprocal facilities will be provided at Ryde, and the service will be run until midnight. The Brighton-Isle of Wight Ferry will commence on June 7 with five services a day, four of which will provide a through service to and from Bournemouth, and two of which will connect with Western Airways' services to and from Bristol and Cardiff. Wireless-equipped "Couriers" will be used.

The company will be represented at Heston in North-Eastern Airways' offices, and their services will connect with this company's so as to provide daily connections in both directions between the Isle of Wight, Leeds, Newcastle and Edinburgh. The company's facilities have been considerably improved at Ryde, and new booking offices are to be established at the pier gates at Sandown and at Ventnor.

Sir Alan Cobham, K.B.E., A.F.C., has joined the Board of the company in the capacity of chairman.



**VERSATILITY : An Austrian mail pilot during the summer months, Hubert Kleinhaus joyrides in the winter from Kitzkeuhl and runs a service, when necessary, to St. Moritz. His machine—of distinctly familiar appearance—is a Hopfner "Superfly" with a Walter "Gamma" engine. Kleinhaus learnt to fly in Germany and took an aerobatic course in this country.**

## *Blind Landings in America*

The Mid-continental route, flown by T.W.A., has been selected by the U.S. Bureau of Air Commerce for the installation of its adoption of the Army Air Corps radio blind landing system, described in *Flight* of December 20. It will be several months before the system is in complete action, and it will, if successful, be arranged along all Federally lighted trunk airways. No blind approaches will be made with passengers until full tests, for which a Martin bomber and a Douglas will be used, are completed.

It will be remembered that the elements of this system, as far as the machine is concerned, are a radio compass—or "homing" device—a marker beacon signal receiver, a sensitive altimeter, and a directional gyro. On the ground there are two stations transmitting on different frequencies, one about 1,500ft. and the other two miles from the airport; at each station there is a secondary transmitter acting as a marker beacon. The pilot, using his radio compass, establishes his course between the two stations, sets this on his directional gyro, descends to 800ft. over the distant station and to 150ft. over the nearer station, and then flies in on his instruments. Needless to say, the sensitive altimeter is set to suit the final barometric pressure.

Although this system depends on the use of established instruments, more responsibility rests with the pilot during the final stage than in the case of the Lorenz-Telefunken system, which is in use at several Continental airports.

## *. . . and at Liverpool*

Speke aerodrome, Liverpool, is to have radio beacons, the installation of which will be carried out by the Marconi Company to the order of the Liverpool Corporation.

The main approach beacon is of the aural type, and will operate on a medium wavelength so that any aircraft fitted with a normal type of receiving apparatus will be able to use it. In addition there will be two marker beacons which will indicate the pilot's "cut-off" points. One is at a distance of three miles from the aerodrome, and the other is near the boundary.

The main transmitter sends out the usual distinctive signals on each side of the course—Morse dots to one side and dashes to the other. The transmitter will be timed so that the dots on the one side occur exactly during the silence periods between the dashes on the other side. An aeroplane flying on the correct course will receive the dot and the dash at equal strength, and, owing to the timed alternate transmission, it will appear as one continuous signal.

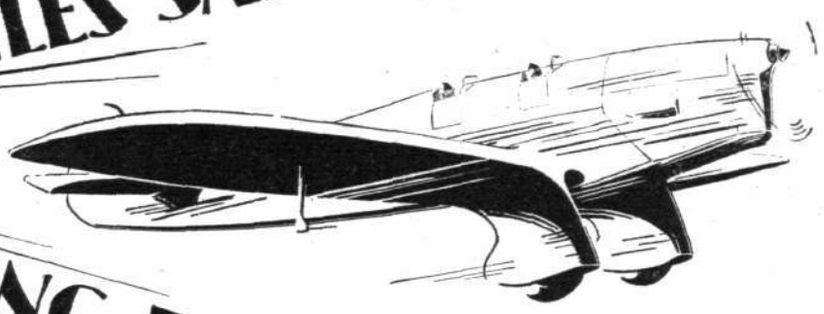
It happens that in the case of Speke the best approach course is in a line with Barton. As Barton is equipped with Marconi D/F this is a distinctly fortuitous coincidence. The beacon at Speke is not, of course, intended to have a long range, as D/F facilities are available. The marker beacons will be audible to the pilot without re-tuning his receiver, and each will have its own distinctive and easily recognisable signal. The aerial system of the main beacon will be unobtrusive—not exceeding a height of 20ft.—and the wavelength will be selected between 820 and 900 metres.

Both the approach and the marker beacons will be remotely controlled from the control tower, and, as a final refinement, the main beacon is arranged so that it can be used by the control office as a telephone or telegraph transmitter in case of emergency.

The Marconi Company is also supplying a sensitive type of receiver for the control office at Speke, with which touch will be maintained with aircraft in conjunction with the station at Manchester.

10% REDUCTION IN INSURANCE to all "HAWK" AIRCRAFT fitted with

MILES SAFETY WING FLAPS



The Hawk Major is miles ahead in performance and price—150 m.p.h. and full equipment for £750! When fitted with Wing Flaps the Hawk becomes the safest and easiest aeroplane it is possible to handle.

PHILLIPS & POWIS AIRCRAFT (READING) LTD.

Telephone READING AERODROME Sonning 114/5

# IMPORTANT ANNOUNCEMENT

## B.I.E.T. TRAINING APPROVED BY ROYAL AERONAUTICAL SOCIETY

In response to the request of a large number of Aeronautical students, we have submitted all our Aeronautical Courses to the Secretary of the Royal Aeronautical Society, and we are pleased to announce that the Courses have received the general approval of that leading Examining Body as constituting Courses which are suitable for candidates for its Examinations.

Since the foundation of the British Institute of Engineering Technology, very special attention has been given to our Aeronautical Group of Courses and meticulous care taken to ensure that they are comprehensive, complete and, above all else, *up-to-date*. It is only recently that we considered it advisable to submit the Courses to the Royal Aeronautical Society for Examination. The fact that the Courses have received immediate approval and recognition from the Society merely endorses the high esteem in which the Courses have already been held

**An interesting feature of our unique Tutorial Organisation is our Guarantee to return full tuition fees to any student who does not pass his selected Examination at the first attempt.**

We specialise in preparing candidates by Home-Study for the **A.F.R.Ae.S., A.M.I.Ae.E., Air Ministry's Ground Engineers' Licences (all categories), Air Navigators' Certificates, Pilots' B Licence (including blind flying)**, and other Examinations of direct interest to Aeronautical men, whilst comprehensive and up-to-date Courses are offered in **Aeronautical Engineering, Aeroplane Design, Aero Engines, Diesel Engines, Materials and Structures, Draughtsmanship, Aerodynamics, Metallurgy, Sheet Metal Work**, and similar subjects



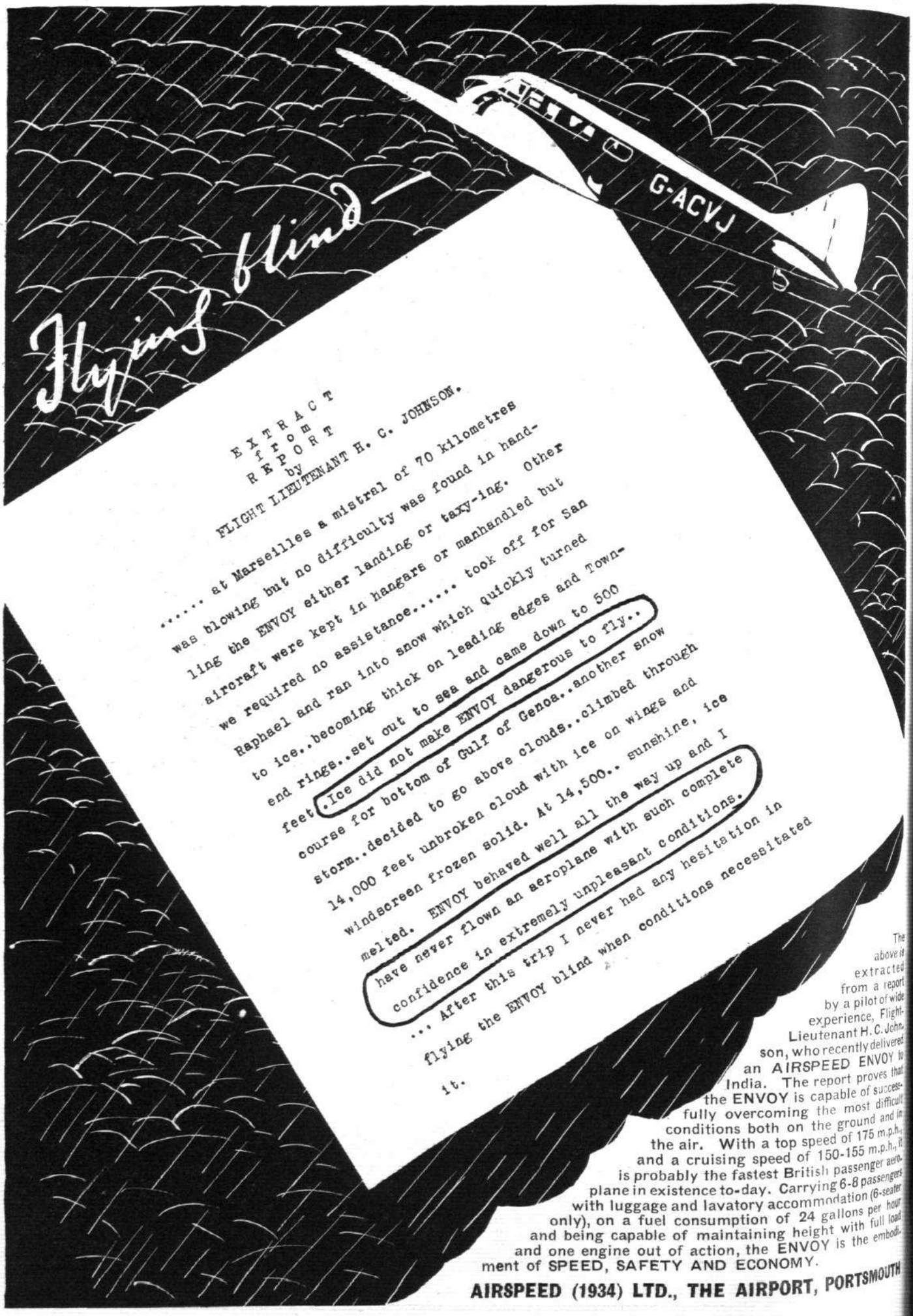

## FREE PROSPECTUS

May we send you a copy of **"ENGINEERING OPPORTUNITIES"**? This important Prospectus contains 268 pages of most useful information and advice. The Handbook will gladly be sent on request—FREE of charge or obligation of any kind.

**BRITISH INSTITUTE OF ENGINEERING TECHNOLOGY**

**306, SHAKESPEARE HOUSE, 29-31, OXFORD STREET, LONDON, W.1**

*South African Inquiries: P.O. Box 4701 Jo'burg. Australasian Inquiries: P.O. Box 3597S, Sydney. Canadian Inquiries: 219, Bay Street, Toronto*


Flying blind—
G-ACVJ
EXTRACT
from
REPORT
by
FLIGHT LIEUTENANT H. C. JOHNSON.
..... at Marseilles a mistral of 70 kilometres
was blowing but no difficulty was found in hand-
ling the ENVOY either landing or taxy-ing. Other
aircraft were kept in hangars or manhandled but
we required no assistance..... took off for San
Raphael and ran into snow which quickly turned
to ice..becoming thick on leading edges and Town-
end rings..set out to sea and came down to 500
feet. Ice did not make ENVOY dangerous to fly..
course for bottom of Gulf of Genoa..another snow
storm..decided to go above clouds..climbed through
14,000 feet unbroken cloud with ice on wings and
windscreen frozen solid. At 14,500.. sunshine, ice
melted. ENVOY behaved well all the way up and I
have never flown an aeroplane with such complete
confidence in extremely unpleasant conditions.
... After this trip I never had any hesitation in
flying the ENVOY blind when conditions necessitated
it.
The above is extracted from a report by a pilot of wide experience, Flight-Lieutenant H. C. John-son, who recently delivered an AIRSPEED ENVOY to India. The report proves that the ENVOY is capable of success-fully overcoming the most difficult conditions both on the ground and in the air. With a top speed of 175 m.p.h., and a cruising speed of 150-155 m.p.h., it is probably the fastest British passenger aero-plane in existence to-day. Carrying 6-8 passengers with luggage and lavatory accommodation (6-seater only), on a fuel consumption of 24 gallons per hour and being capable of maintaining height with full load and one engine out of action, the ENVOY is the embodi-ment of SPEED, SAFETY AND ECONOMY.
AIRSPEED (1934) LTD., THE AIRPORT, PORTSMOUTH

## *Four More Master Pilots*

Imperial Airways pilots naturally have a better chance than anyone of obtaining the experience necessary to pass the stiff requirements for obtaining the Master Pilot's certificate, and four more awards have now been made. The latest holders are Captains F. V. W. Foy, W. Armstrong, O. P. Jones, and H. H. Perry, bringing the total number to nine—all obtained by Imperial pilots.

## This *is a Beacon !*

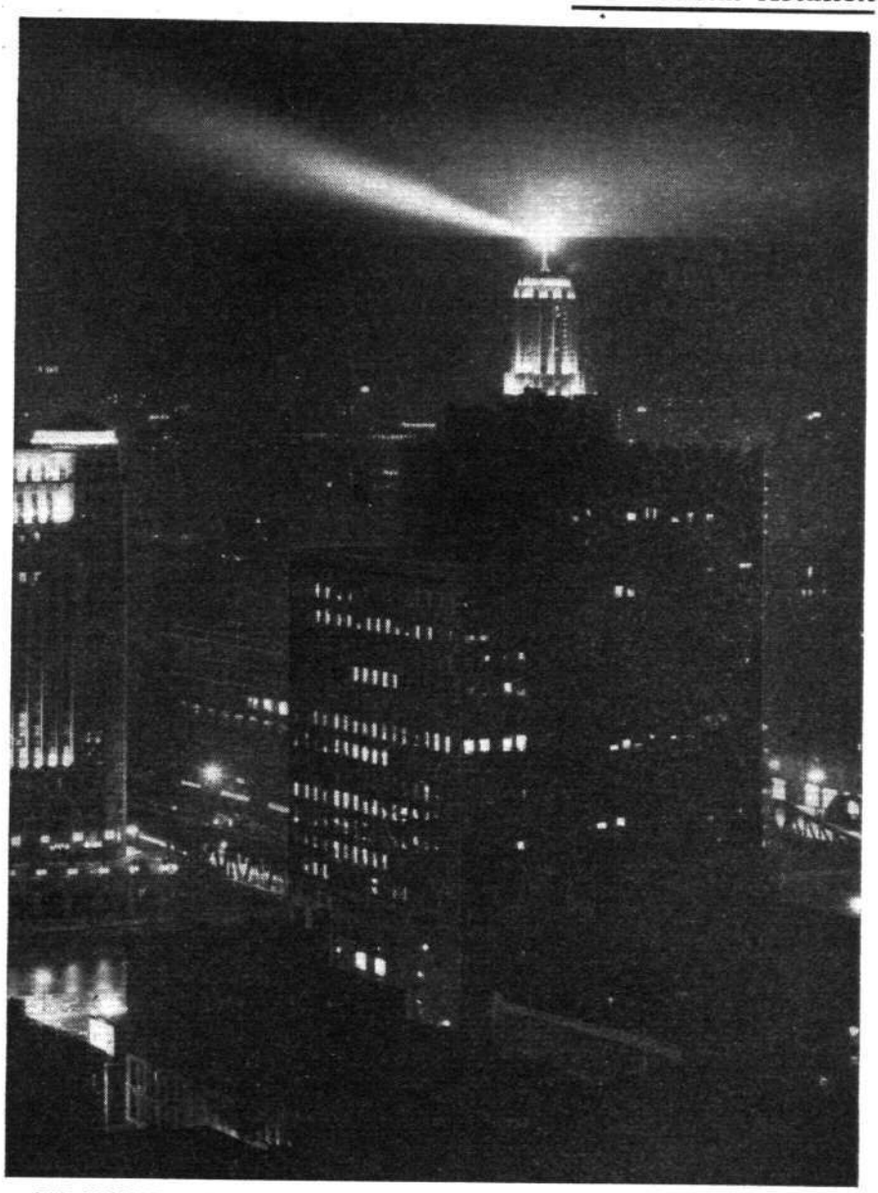
Seventy-five feet above the topmost floor of the Palmolive Building, Chicago, is the Lindbergh beacon, probably the most powerful in the world. A high-intensity arc lamp—in which the carbons must be charged every 1½ hours!—gives a light of two billion candle-power from a reflector five feet in diameter, the whole beacon making some two revolutions a minute. If such a figure in candle-power conveys nothing, then it can be said that at a yard the light is 20,000 times brighter than noon sunlight.

A second lamp is placed directly below the beacon itself and is permanently trained on Chicago's airport. This light is supplied by incandescent lamps, and the candle-power totals some 11½ millions. Two light keepers, relieving each other at midnight, serve the beacon, which is in operation from dusk to dawn. Incidentally, from a machine flying at a normal operating height it can be seen, in clear weather, at a distance of 200-250 miles. This beacon is the only one in Chicago which has a reflector diameter greater than three feet—the minimum size for beacons using a white light.

The supporting steel and aluminium tower surmounts a limestone penthouse which covers a great part of the roof of the Palmolive Building. In the centre of the tower, encased in ½in. steel plates, an automatic elevator rises to a point fifteen feet from the top.

The beacon was a gift by the late Mr. Elmer A Sperry, a former resident in Chicago, and, of course, famous for his gyroscopic and other instruments and the manufacture of airway beacons. However, $132,000 was spent by the Palmolive people on its installation, and the annual operating costs are in the region of $15,000, which sum includes an electricity bill of $3,000!

The only similar beacon in this country is, or was, placed on the roof of a tall building in Manchester with the second light directed at Barton airport.



**BY NIGHT : The Lindbergh Beacon photographed from the top of the Chicago Civil Opera House, more than two miles away.**

## *New Equipment for China National*

Fairchild amphibians and a Lockheed "Electra" are to replace the Loening amphibians and the Stinsons on some of the China National Aviation Corporation routes. D/F. stations are being installed at Shanghai and Canton.

At present C.N.A.C. operates services between Shanghai, Hankow and Chungking, Shanghai and Peiping, Chungking and Chengtu, Shanghai and Canton. According to *Shell Aviation News*, 833,416 miles were flown last year and 4,570 passengers carried.

## *Preparing the Pacific*

Last week we gave the names of the various island bases to be used by P.A.A. on its experimental Pacific service. Alameda airport, in San Francisco Bay, and San Diego, the naval station, will be used as temporary bases on the American coast. It is improbable that certain harbour improvements necessary at Los Angeles can be completed in time for the preliminary flights. A development programme has been started at Alameda.

Meanwhile the special Sikorsky S.42 has completed some five thousand miles of training operations on the Atlantic route. Its first long-range flight was from Miami to Puerto Rico and return, a total distance of 2,400 miles. The non-stop flight return was made in 8 hr. 27 min. Data has been collected on such equipment as a new drift sight, a system of automatic detail engine lubrication, and new octants and sextants. Consumption figures have been taken at various throttle settings. The initial programme has now been completed, and the second series of flights should, by now, have started, in which the machine will be taken to its full range limit—3,000 miles, or even more.

The naval authorities in Japan are now objecting to the Pacific bases on the very reasonable grounds that these could be converted at short notice into naval stations.

## *Monospars for Australia*

For some months it has been known that General Aircraft, Ltd., have a large commercial type on the stocks for Oceanic Airways, of Australia. Last Friday, while opening the informal little ceremony concerned with the christening of two Monospar S.T.12s (two "Gipsy Major" engines) bound for the same Australian company, Sir Maurice Bonham-Carter hinted that these new machines would have a cruising speed in the neighbourhood of 200 m.p.h

The ceremony was performed by Mrs. S. M. Bruce, the wife of the Australian High Commissioner, and the first two machines destined for Australia were successfully named *Captain Cook* and *Captain Phillip*. Of course, one of the massed photographers forgot to press something at the psychological moment and Mrs. Bruce was prevailed upon to beat once again an already well-beaten bottle of Australian wine. These Monospars, the first of a large series, are to be used to feed the Melbourne-Brisbane service.

The affair was an important one inasmuch as it virtually marked the signing of a most important contract for civil aeroplanes. The Australian company chose the S.T.12 for feeder work, after examining a number of types both here and abroad, because of its exceptional take-off and its good performance with one or both engines.

After the ceremony Flt Lt. Schofield showed the assembly something of the "fighter" performance possessed by this type in a lightly-loaded condition.

# SOME INTERESTING INSTRUMENTS

## *An "Automatic Air Log" : Electrically Operated Turn Indicator : A Distance Recorder*

BOTH trip time and total flying time are recorded by the Automatic Air Log, produced by the Air Log Co., Ltd. The instrument is usually worked from a pitot head, but a venturi tube may be employed if desired, and in the former case a "T" joint is inserted in the main lead from the pitot head to the A.S.I.

The instrument consists of a cup-shaped casing, to the rear portion of which is secured a metal capsule which is provided with a nipple connected to the "T" joint. Within the casing is a clockwork mechanism with the inner end of the main spring attached to a winding spindle provided with a winding and resetting knob. The capsule is connected, by means of a spring lever, with a wire, which is normally disposed between two teeth of the escapement wheel. When the aircraft to which the Air Log is fitted has taken off, and when sufficient air pressure is applied to the capsule, the wire is lifted away from the escapement wheel, thus starting the clockwork mechanism.

In order to indicate trip time a hand is carried by a sleeve rotatable upon the winding spindle, and is driven at the rate of one revolution per hour. A "trip hour" integrating device is provided for recording the number of complete revolutions made by this hand during the flight.

The instrument also embodies a "total time" indicator comprising a series of four discs driven by star wheels so as to indicate decimals, units, tens and hundreds of hours' flight. The hand co-operates with a "minute" scale, each minute being divided into quarters for the purpose of enabling accurate time indications to be made.

The address of the Air Log Co. is 193, Elgin Terrace, London, W.9, and the sole agents are S. Smith and Sons.

### *Two Pullin Instruments*

With the intention of overcoming the disadvantages sometimes attendant on normal venturi operation, R. B. Pullin and Co., Ltd., have produced a turn indicator which is operated electrically.

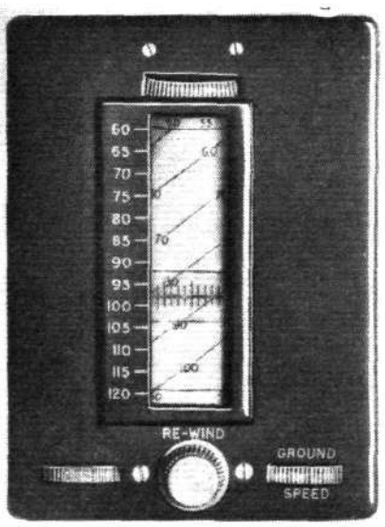
Power is obtained from a twelve-volt supply, and the motor consumes only 0.2 ampere. If desired, 24-volt models can be supplied. The gyro wheel of the indicator, which runs at 4,500 r.p.m., is the armature of a D.C. motor revolving outside the field of the motor Thus there are no stray fields to cause deflection of the magnetic compass, and the indicator may be placed in close proximity to that instrument without having any adverse effect.

The field is located on a gimbal ring which is pivoted in the main frame of the instrument. When fitted in an aircraft, the gyro spins about a horizontal axis transverse to the fuselage of the machine The gimbal ring is capable of rotation about the fore and aft axis, and, as the aeroplane turns, the gyro axis endeavours to take up a vertical position. In other words, the gyro tends to set itself parallel to the plane of the turn. When the turn is completed the gyro is returned to its normal position by a small helical spring, the movement being damped by the aid of a pair of dashpots at the rear of the instrument. The pointer indicating "turn" moves across the bottom of a graduated dial, whose divisions represent turns of 125 deg., 275 deg., and 475 deg. per minute.

"Slip" or "bank" is indicated by a pointer moving across the top portion of the dial, and worked by a patented balanced pendulum which moves at all times in the correct sense. Thus any "bank" or "slip" to the left will be indicated by the pointer moving to the left, and vice versa. This indicator is mounted on jewel bearings, and is provided with two hair springs. Damping is provided by a vane or paddle behind the dial. It is claimed by the manufacturers that, as there is no form of link, friction and "dither" are eliminated.

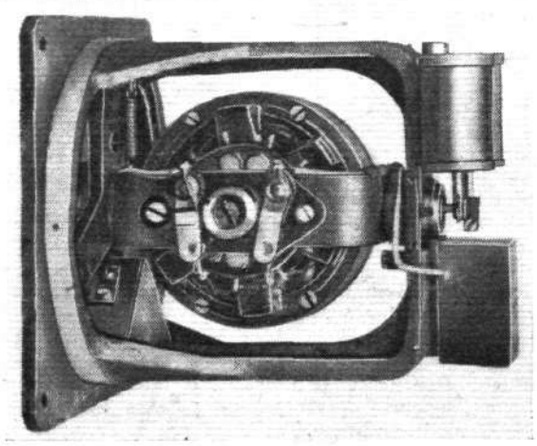
The address of R. B. Pullin and Co. is Seaford Road, West Ealing, London, W.13, and the instrument is being marketed by the Williamson Manufacturing Co., Ltd., of Litchfield Gardens, Willesden Green, London, N.W.10.

Another noteworthy instrument constructed by R. B. Pullin and Co., Ltd., in this case under the patent of Mr. F. D. Bradbrooke, is the "Travelog," which, provided the ground speed is applied accurately, indicates automatically the distance travelled by an aircraft in consistent flight. The principal element in the instrument is a cone rotated by clockwork, on which are inscribed distance curves representing intervals of ten miles. These curves are numbered accordingly, and the reading for "distance" is obtained from them as they pass the zero point on the ground speed cursor, which is moved up and down the vertical window for adjustment to ground speed. This is inscribed with a graduated cursor scale, the centre mark of which represents the zero point. Thus, when the curve marked "40" cuts the zero point, the distance travelled is 40 miles.



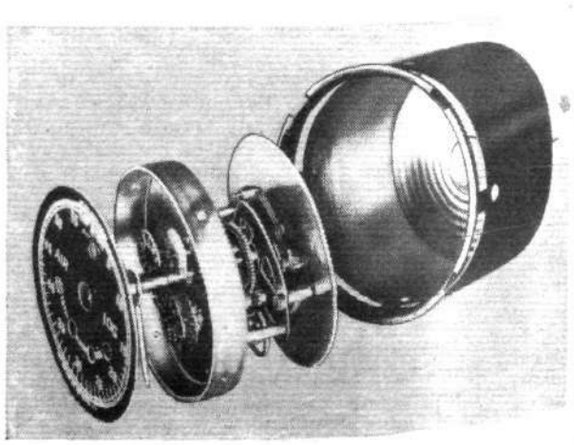

**The "ground speed" cursor of the "Travelog" moves up and down the window through which the "distance" curves show.**

On each side of the zero point are five graduations representing one mile each, and these provide fine reading between the distance curves at their ten-mile intervals. As the cone rotates from right to left the graduations on the left of the zero point represent additional miles as each distance curve traverses them. The graduations to the right of the zero point represent miles to be deducted from the curve reading. After one hour's flying the cone "comes full circle," and the low-reading curves reappear. The high-reading curves in use become dotted as they cross the zero curve and continue to indicate for a reasonable time before discontinuing, thus giving ample time to reset the cone.



**(Left) The Pullin electrically driven turn indicator, showing the mounting of the gyro wheel and the "paddle" box for the "bank" indicator.**

**(Right) At the rear of the case of the Air Log is the metal capsule through the medium of which the clockwork mechanism is operated.**

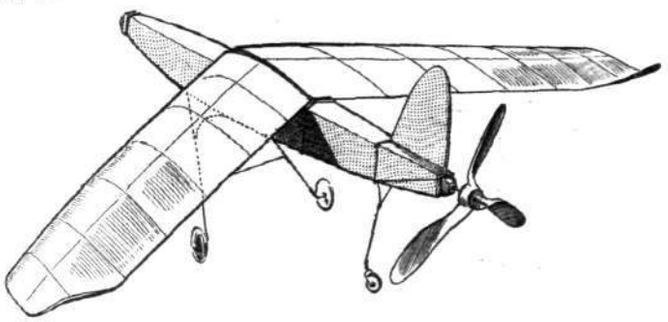


# MODELS

## *A "Pterodactyl" Model : More Competitions : A Visit to France*

### THE BAGGS "TERROR"

THE accompanying sketch shows an experimental model of the "Pterodactyl," constructed by Mr. Frank B. Baggs, who is a T.M.A.C. member. This model was primarily constructed to try out the principle, and passed through one or two modifications before success was finally obtained. As



A model "Pterodactyl" constructed by Mr. F. B. Baggs.

shown it flies quite well, although the necessarily large diameter of the propeller at the rear prevents sufficient angle of incidence being given to the wings for easy R.O.G. flights.

The model is constructed of balsa throughout, except for one or two minor items. The rectangular section fuselage is covered with doped silk, but the wings—which are in two units—are covered with Japanese paper. Negative wash-out is, of course, given to the wing-tips, and the wings are set at a rather pronounced sweep back. There are no other horizontal surfaces, but the addition of a fairly large vertical fin, just in front of the propeller, was found necessary. The propeller, a three-blader, is constructed of very thin plywood, and is provided with a free-wheel device. The principal characteristics of the "Terror" are:—

Span, 30½in.; chord, 4½in.: overall length, 17½in.; weight, 1¾ oz.

This model won T.M.A.C. Cup in establishing a record for its class with 90 seconds duration.

### DONCASTER, PLEASE NOTE!

MR. JOHN W. HOLMES, of Doncaster, is anxious to get into touch with any enthusiasts in this district who are keen on the development of flying scale-model and petrol-powered model aeroplanes, with a view to working out a programme of experimental construction during the coming season. Readers who may be interested should communicate with Mr. Holmes at 185, Beckett Road, Doncaster.

### T.M.A.C. COMPETITIONS

THE following programme has been announced by the Model Aircraft Club. The chief event of the season will be the Inter-Group Contest for T.M.A.C. Cup, which will take the form of a series of four contests, all R.O.G.: (a) Heavyweights (wing loading of over 5 oz.); (b) mediumweights (loading 2·5 oz.); lightweights (loading up to 2 oz.); (d) scale models.

May 5.—Rally at Wormwood Scrubbs: (1) Inter-group contest, heavyweight. (2) Take-off contest, open to all.

May 19.—Rally at Hackney Marsh: (1) Inter-group contest, mediumweight. (2) R.O.G. contest for model travelling greatest distance, open to all.

June 2.—Visit to Hayes and D. M.A.C., Fairey's Aerodrome.

June 9.—Rally at Wimbledon: (1) Inter-group contest, scale models. (2) Relay race for Buckland Cup. (3) Hand-launched duration contest for those who have not yet won a prize in a flying contest.

July 14.—Wimbledon: (1) T.M.A.C. attempt for Farrow Shield. (2) Duration and efficiency contest, R.O.G., open to all.

July 28.—Rally at Wimbledon: (1) Inter-group contest, lightweight. (2) Autogiro contest, hand-launched, open to all. (3) Gliding contest, open to all. (4) Selection of T.M.A.C team for the National Cup contest.

August 18.—Speed contests, R.O.G. and H.L., open to all.

September 1.—Power contests at Fairey's Aerodrome: (1) Petrol and steam models. (2) Compressed-air models. Open to all.

September 8.—Seaplane contest, R.O.W., Danson Park, open to all.

### INDOOR FLYING

ON March 13 the last of the five indoor flying meetings organised by T.M.A.C. was held at the Horticultural Hall, London. There was a large attendance. Representatives of most of the London clubs were present by invitation, and some excellent flying took place. Quite a high proportion of the models now spend a considerable period in the region of the ceiling.

It is difficult to single out individual achievements, but it must be mentioned that Messrs. H. Crow and E. Ross aroused considerable interest with two wingless Autogiros. This was the first opportunity many aeromodellists had of seeing model Autogiros functioning.

The meetings have been of great interest and have revealed considerable improvement in the indoor class of model since the previous season.

### OBITUARY

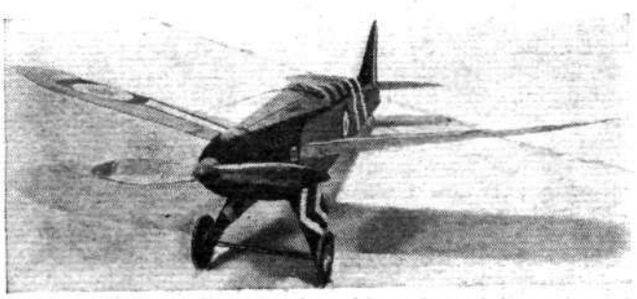
WE regret to record the death, which occurred on January 29 last, of Mr. William Joseph Plater, of Bromsgrove, Worcs., whose name will be known to many aeromodellists. Mr. Plater (who was only forty years of age) took an active part in aeronautics since early boyhood, and later his efforts were rewarded by his obtaining a prominent place in aeronautics. He was a Fellow of the Royal Aeronautical Society, an Associate Member of the Institute of Aeronautical Engineers, and a Member of the S.M.A.E. His interest in model aircraft led to his being one of the leading authorities in this branch of aeronautics.

In addition to being associated, during the war period, with the aircraft works of Hewlett and Blondeau, at Luton, he also held positions at the R.A.F. training centres at Cranwell and Halton, and his last position was that of developing and taking charge of the Handicraft Section of Bromsgrove School.

### AN INVITATION FROM FRANCE

THE Model Aeronautical Associations of France offer a hearty invitation to English co-modellists to participate in a *concours* of an international character taking place at the Parc de Vincennes on Easter Sunday, April 21. The competitions are to be for both model aeroplanes and gliders, and are divided into two classes, "Libre" and "International"—the latter employing a formula almost identical with that for the "Wakefield Cup" contest. Numerous prizes will be offered, including two cups for aeroplanes and gliders respectively.

The closing date of entry is April 7, and arrangements have been made with Thos. Cook and Sons for party rates at £3 18s. each person, including third-class return fare, Newhaven-Dieppe, from Saturday to Tuesday, lunch on boat, hotel-bedroom, breakfasts and dinners; no passports are required. Those wishing to attend or compete (ladies included) should communicate, enclosing stamped addressed envelope, with Mr. J. G. Portsmouth, 3rd Group (De Havillands), T.M.A.C., 29, Chamberlayne Mansions, Kensal Rise, London, N.W.10, or Mr. H. C. Chatterley, Hon. Sec., Northern Heights Model Aircraft Club, 9, Landrock Road, Crouch End, London, N.8.



YET ANOTHER! Mr. W. Rigby's latest flying model—the "Condor," which has a span of 26in. Like most of Mr. Rigby's productions, it is made entirely of paper.

# THE INDUSTRY

### JUBILEE

MR. R. F. DAGNALL—whose streamlined initials are, perhaps, familiar to those of our readers who study the advertisement pages—celebrates this month his twenty-fifth year of activity in the aviation industry. *Congratulations!*

### A CHANGE OF NAME

The name of Wrightson Aircraft Sales, Ltd., has been changed to Malcolm and Farquharson, Ltd. There has, however, been no change in the management, and the new company will continue their prompt service at Heston Aerodrome.

### NEW DIRECTOR FOR SURVEY COMPANY

Air Comdre. J. Q. Hearson, who at the end of the war was Director of Training in the R.A.F., has joined the Board of Geological Air Surveys, Ltd., a subsidiary of H. Hemming and Partners. This latter company is engaged upon, among other important work, the photographic survey (reported recently) of a portion of the Fly river territory in Papua.

### ONE THOUSAND BRISTOL ENGINES

Over one thousand Bristol engines of the "Mercury" and "Pegasus" series, which went into production in 1932, had been manufactured and delivered against existing orders by December of last year. There are indications that this output will be substantially increased during the present year, and preparations to meet this demand have already been made by the recent extension to the works at Filton.

### AN AIRCRAFT RADIO COMBINE

Radio Transmission Equipment, Ltd., is the title of a new company which has been formed to combine the resources of the Plessey Co., Ltd., the Mullard Wireless Service Co., Ltd., and N. V. Philips. This new company will have offices in the same building as the Plessey Co. at Vicarage Lane, Ilford, and all development work and manufacture for England and the Empire will be done in that factory. The new company will be able to supply any type of radio apparatus for aircraft or aerodromes, including all radio navigation devices.

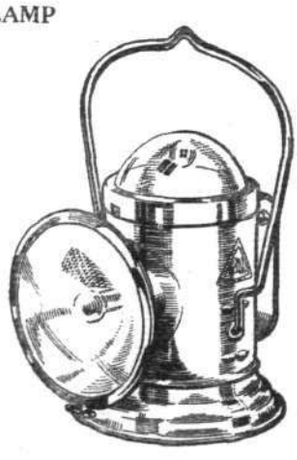
### NEW AIRCRAFT ISSUE

It is being publicly announced to-day that Phillips and Powis Aircraft, Ltd., are offering for sale 269,605 five-shilling shares at six shillings each. Manufacture of the "Miles Hawk" series of aeroplanes was started in 1933. That year the profit was £2,427, and the following year £7,438. The issue is being handled by the London and Yorkshire Trust, Ltd. The steady growth of Phillips and Powis Aircraft (Reading), Ltd., from whom the new company is taking over, has shown that they are supplying a very definite demand, and the results they have achieved are such as to inspire confidence in their future.

### A HANDY LAMP

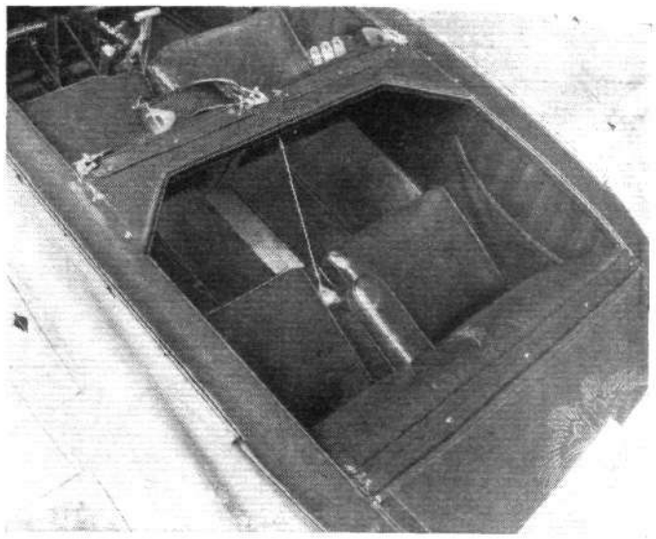
There must be scores of uses around an aerodrome to which the "Powerlite" (marketed by E. P. Barrus, Ltd., of 35, Upper Thames Street, London, E.C.4) could be put.

The light, which is normally operated from a six-volt dry battery, embodies two reflectors, one, on the side, being a "spot beam," and the other, on the top, a miniature floodlight. Cylindrical in shape, the body of the lamp carries two handles, one fixed and the other a wide arm handle. By means of these the lamp, using either reflector, may be carried by hand or mounted on a wall.



The "Powerlite."

The battery is inserted in the lamp base, which is held in place by a bayonet lock. A spring keeps the battery pressed against annular contacts and there is a two-way switch for operating either of the lights, the mid position of the switch representing "off." A special unshatterable material is used for the 5in. "beam" reflector, the "top" or "flood" light being of glass. This latter, for which a guard may be supplied, can be coloured red if desired.



**COMFORTABLE UPHOLSTERY: This unusual view of an aeroplane cabin is made possible by the fact that the cabin top of the machine—the De Bruyne "Snark"—hinges right back and leaves the cabin itself entirely clear for the passengers to enter. The upholstery which makes the four passengers comfortable has been done by L. A. Rumbold and Co., Ltd., of Kilburn, London, N.W.6.**

### TWENTY-FIVE YEARS' SERVICE

Mr. P. J. A. Clausen, Director of Bosch, Ltd., of Acton, London, has just completed twenty-five years' service in connection with the representation of Bosch products in England. The directors at the Stuttgart factory, as well as his co-directors and staff in London, have taken this opportunity of handsomely marking their appreciation of the services rendered by Mr. Clausen.

---

### NEW COMPANIES

BORDER FLYING CLUB, LTD. Limited liability company without share capital. Objects: to promote, assist, teach and encourage aviation in all its forms and the study of aerial navigation and aeronautics, and to establish, maintain and conduct a club, etc. The subscribers are:—Harold Carr, Millbrooke; Ronald N. Carr, Herbert Filmer, Ronald Davidson, Thomas S. Robinson, R. Stormont Hays, H. M. Prescott, George L. S. Lightfoot, and G. H. Routledge. Solicitors: Saul & Lightfoot, 21, Castle Street, Carlisle.

CAMPBELL BLACK (AVIATION), LIMITED, King William Street House, London, E.C.4. Nominal capital £2,000 in £1 shares. Objects: to establish, maintain and work lines and services of aerial conveyance for mails, passengers or goods within the U.K. and between the U.K. and any other places from time to time selected by the company all over the world, and to undertake all kinds of aerial transport, etc. The first directors are:—Thomas Campbell Black and Florence Elizabeth Dawson. Solicitors: Gwyn Davies & Co., King William Street House, E.C.4.

CRILLY AIRWAYS, LTD., 14, Waterloo Place, London, S.W.1. Capital £12,000 in 10,000 6 per cent. cumulative preference shares of £1 each and 20,000 ordinary shares of 2s. each. Objects: to establish and carry on lines of aerial communication by means of aeroplanes and other aerial conveyances, and to carry on the business of carriers of passengers and goods by air, sea and land, etc. The provisional directors are:—Constance M. Nye, 7, Burnell Road, Sutton (company secretary), and Wm. R. Arthur Edwards, 3, Shaftesbury Avenue, Southall, Middlesex (company director). Solicitors: Bancrofts, 109, Kingsway, W.C.2.

◈ ◈ ◈ ◈

### PUBLICATIONS RECEIVED.

*Der Schnellverkehr in der Luft und seine Stellung im neuzeitlichen Verkehrswesen.* Berlin: Verkehrswissenschaftliche Lehrmittelgesellschaft M.B.H. Bei Der Deutschen Reichsbahn.

*L'Aviazione Civile attraverso il Mondo.* Informazioni e Notizie. No. 6. December. Italy: Ministero Dell'Aeronautica, Laboratorio Fotomeccanico Roma.

◈ ◈ ◈ ◈

### AERONAUTICAL PATENT SPECIFICATIONS

*Abbreviations:* Cyl. = cylinder; i.c. = internal combustion; m. = motors.

(The numbers in parentheses are those under which the specification will be printed and abridged, etc.)

#### APPLIED FOR IN 1933

*Published March 21st, 1935.*

22704. ELEKTRONMETALL GES. Brake mechanism. (424,265.)

23331. MACCLAIN, A. L. Air-cooling of radial-cylinder internal-combustion engines. (424,498).

29844. A.T.S. CO., LTD., and WYLIE, H. N. Manufacture of light-metal members suitable for aircraft. (424,358.)

#### APPLIED FOR IN 1934

23562. ENDRES, H. Fluid-reaction propelling apparatus. (424,546.)

# FLIGHT

**Prepaid Advertisement Rates: 2d. per word, minimum 3/6.** Series Discounts are allowed to trade advertisers as follows on order for consecutive insertions, provided a contract is placed in advance. 13 consecutive insertions, 5%; 26 consecutive, 10%; 52 consecutive, 15%. Situations Wanted ONLY, 18 words, 1/6, 1½d. per word after. Box No., 6d. per insertion extra. Latest time of arrival of advertisements for these columns, **FIRST POST TUESDAY** of each week at: Dorset House, Stamford Street, London, S.E.1, or one day earlier at branch offices (addresses, see first Editorial page).

# MISCELLANEOUS ADVERTISEMENTS


**MALCOLM & FARQUHARSON, Ltd.**
(formerly WRIGHTSON AIRCRAFT SALES LTD.)

**£600** BRITISH KLEMM "Swallow." 12 months C. of A. New in June, 1934. British Salmson 75 h.p. engine, only 20 hours since completely overhauled and modified by makers. Special finish, and extra instruments.

**£545** PUSS MOTH. C. of A. to September. Engine just top overhauled, air frame repainted and entirely reconditioned. Fitted bronze heads. Turn and bank indicator, navigation lights.

**£425** GIPSY II MOTH. C. of A. to November, 1935. Total hours 380, since complete overhaul. 20. Just repainted, and fitted with airwheels, spats, cockpit covers, etc.

**Any make of new or second-hand aircraft supplied. Write for full list and particulars:**

**HESTON AIRPORT, HOUNSLOW**
Telephone: Hounslow 2345. MIDDLESEX.

FOR HIRE PURCHASE OF ALL TYPES OF AIRCRAFT
Consult—
**AIRCRAFT FACILITIES LTD.**
6, Broad St. Place, E.C.2
Telephone London Wall 3541-2-3

**FOR SALE** 1934 3-10 Passenger Dragon, equipped Marconi Wireless, C. of A. to 16th May, 1935.
8-9 Passenger Metal Wessex, 3/140 h.p. Genet Major Engines, with C. of A. for 1 year.
Full particulars from Box No. 8705, c/o "Flight," Dorset House, Stamford Street, London, S.E.1.
*Hire Purchase Terms Arranged.*

USE THE G.Q.
100%
BRITISH PARACHUTE
Approved by
THE BRITISH AIR MINISTRY
Demonstration upon Request.
THE G.Q. PARACHUTE Co. Ltd.
Stoke Rd., Guildford, Surrey.


## Clothing


GENUINE R.A.F. LEATHER COATS, fleece lined, slightly worn, 3 gns., 4 gns. and 5 gns. Government stock, fine value. Sent on approval on receipt of cash or C.O.D. Also Flying Suits, Helmets, Goggles, Earphones, etc. MOSS BROS. & CO., LTD., King Street, COVENT GARDEN, W.C.2.


## Aircraft and Engines For Sale


HERMES METAL AVIAN, C. of A. August. Dual instruments including compasses. Navigation lights. Low and high pressure wheels. All modifications. Perfect condition: £275. HERMES II ENGINE: hours since complete. 245; hours since top, none. All new pistons: £40. Box No. 8732, c/o "Flight," Dorset House Stamford Street, London, S.E.1.

MILES HAWK. 12 mths. C. of A. Dual control, wheel brakes. A perfect private owner's machine with exceptional performance. Box No. 1019, c/o "Flight," Dorset House, Stamford Street, London, S.E.1.

COMPER SWIFT (POBJOY), ONLY 40 HRS. since new, 12 months C. of A. Especially faired, finished and equipped, including navigation and cockpit lights, extra 10-gallon tank giving 5 hrs. range. Irvin Airchute, Reid & Sigrist blind flying instruments, 2 suitcases. Cost over £700 new, nearest offer to £390. Surrey Flying Services, Ltd., Air Port of London, Croydon. Telephone: Croydon 3421.

FOR Sale. 40 h.p. Salmson Klemm, cruises 70, C. of A. November, 30 hrs. since top overhaul and C. of A. £225. R. Somerset, North Eastern Airways, Heston.


## Official Notices

**ROYAL AIR FORCE.**

APPLICATIONS are invited for short service commissions (six years active list and four years reserve service) in the General Duties Branch (Flying). Candidates must have attained their 18th, but not their 22nd birthday. They must have been educated up to or beyond the School Certificate standard and must be of good physique. Apply Secretary (Dept. S.7. R), Air Ministry, Kingsway, London, W.C.2.

**VACANCIES FOR 500 BOYS.**

THE ROYAL AIR FORCE requires 500 boys of good education (who must have attained age of 15 and be under 17 years on 1st August, 1935), for training as aircraft apprentices in skilled trades. No experience required. Good training, pay and prospects. Examination at local centres. Particulars from Royal Air Force (Dept. FL) Gwydyr House, Whitehall, S.W.1.

**AIR MINISTRY**
**Department of the Director-General of Civil Aviation.**

Four temporary assistants are required. The salary scale is £333 rising by seven annual increments to £451 per annum.

All Candidates must have had a good general education, must have qualified as pilots and have had some administrative experience. In addition, for three posts candidates should have a sound knowledge of elementary science and engineering and some knowledge of air navigation and of airway requirements. For the fourth post, candidates must have first-class navigational qualifications or experience in lieu, whilst blind flying experience will be regarded as an additional qualification.

Applications stating qualifications, experience and date of birth should be addressed to reach the Secretary (S.1), Air Ministry, Adastral House, Kingsway, not later than 30th March, 1935.

## Patent and Trade Mark Agents


STANLEY, POPPLEWELL & FRANCIS, Chartered Patent Agents, 88-90, Chancery Lane, London, W.C.2. Telephone: Holborn 6393. Established 1879.

A. P. THURSTON & CO., Chartered Patent Agents, 329, High Holborn, W.C.1. Tel.: Hol. 1117.

GEE & CO. Patents and Trade Marks throughout the World. (H.T.P. Gee, Mem. R.S.G.B., A.M.I.R.E., etc.), 51–52, Chancery Lane, London, W.C.2 (2 doors from Govt. Patent Office). 'Phone: Holborn 1525. Handbook free.

KING'S Patent Agency Ltd. (B. T. King, C.I.M.E., Registered Patent Agents, G.B. U.S.A., and Canada). Advice, Handbook and Consultations free. 49 years' references. 146a, Queen Victoria Street, E.C.4. 'Phone: City 6161.

**HENLYS SPRING SALE**

May we send you our list of 24 USED AIRCRAFT?

Buy your Aircraft from Henlys and LEARN TO FLY FREE!

Distributors in the U.K. for
**AVRO CADET & AUTOGIRO**

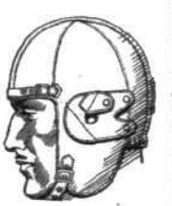
**HESTON AIRPORT, MIDDLX.**
'Phone: Hounslow 2345.

**WAINWRIGHTS AIR WEAR**

**10% DISCOUNT TO R.A.F., CLUB & MEMBERS OF THE AIR LEAGUE**

In fine quality WHITE or FAWN washing drill, self lined, fitted sorbo padded earphone pouches. Adjustable forehead and chin straps.

**ALL SIZES 7/6 and 9/6**



*Leather Helmets, lined chamois, as above,* **12/6 & 18/6**
*Flying Suits,* **21/-.** *Earphones,* **7/6.**
*Airtight Goggles,* **12/6 15/6 & 25/-**

**WAINWRIGHT'S**
**300-302, Euston Road, London, N.W.1**
**Telephone: Museum 6280**

**PHOTOGRAPHY MADE EASY**
***A Book of Elementary Instruction.***
**Price 2/-. By Post 2/3.**
**Iliffe & Sons Ltd.,**
**Dorset House, Stamford St., London, S.E.1.**

# RUBBER PARTS

*of every Description for Aircraft*

**DURUBBA** — Tubing for Petrol, Oil and Water

**TURNER** — Shock Absorber Rings and Cords

**BUFFERS, SPONGERUBBER, Etc., Etc.**

The Directors of LUKE, TURNER & CO., and of BURLEY LIMITED, are the pioneer manufacturers of aircraft rubber. Their very wide experience is gladly at the disposal of Designers and Builders.

**COMPRESSION RUBBERS**
*TO EVERY SPECIFICATION*

Release notes authorised by A.I.D. Contractors to the Air Ministry.

# BURLEY LIMITED

RUBBER PRODUCTS

192, TOTTENHAM COURT ROAD, LONDON, W.1

Telephone MUSEUM 5042

Telegrams DURUBBA WESTCENT, LOND

# COMMERCIAL AIR HIRE LTD

★ *TO THE TRADE ONLY*

5-10 Passenger D.H. Dragons available with Pilots DAY or NIGHT. Fitted wireless and navigation lights.

*SPECIAL RATES FOR CONTRACT WORK*

**AIRPORT OF LONDON**
**CROYDON** 'Phone : Croydon 64

**Complete Training for "B" LICENCES**

**NIGHT FLIGHT**—including instruction and insurance, on Gipsy II Metal Moth with complete blind-flying equipment—at the lowest price in the country—**£20**

**SOLO**—**£1** per hour on Contract (50 hours).

**BLIND FLYING AND ALL OTHER INSTRUCTION**—**£2** per hour.

**THE HERTS AND ESSEX AEROPLANE CLUB,**
**Broxbourne Aerodrome, Nazeing, Essex.**
*Tel.: Hoddesdon 453.* **THREE INSTRUCTORS—FIVE MACHINES.**

**SAFETY FIRST**

# SALTER'S SPRINGS *and* IMPROVED ROLLER BEARINGS

GEO. SALTER & CO., LTD., WEST BROMWICH.

**ENSURE RELIABILITY**

# PHOSPHOR BRONZE to Air Board Specifications

| | | | |
|---|---|---|---|
| Rods, drawn | - - | to Specification | DTD.78. |
| Tubes, drawn | - - | to ,, | DTD.79. |
| Bars, chill-cast | - - | to ,, | 2.B.8. |

**CHARLES CLIFFORD & SON, LTD., BIRMINGHAM, 5**

TRADE MARK

Telephone : Midland 2152 (P. B. Ex.)

*The Autocar*

# REGISTER

*for* MOTORISTS

"The Autocar Register" enables motorists to keep an accurate record of all the expenses incurred in the purchase and upkeep of a car. Careful account can be made of tyre performances, mileage and petrol consumption, and other expenses of ownership.

PRICES: Cloth Boards, **3/- net. By Post 3/4**

*From all leading Booksellers or direct from the publishers:*
**ILIFFE & SONS LTD., Dorset House, Stamford St., London, S.E.1**

# YOUR CAR HOW IT WORKS

EXPLAINED IN THE SIMPLEST LANGUAGE

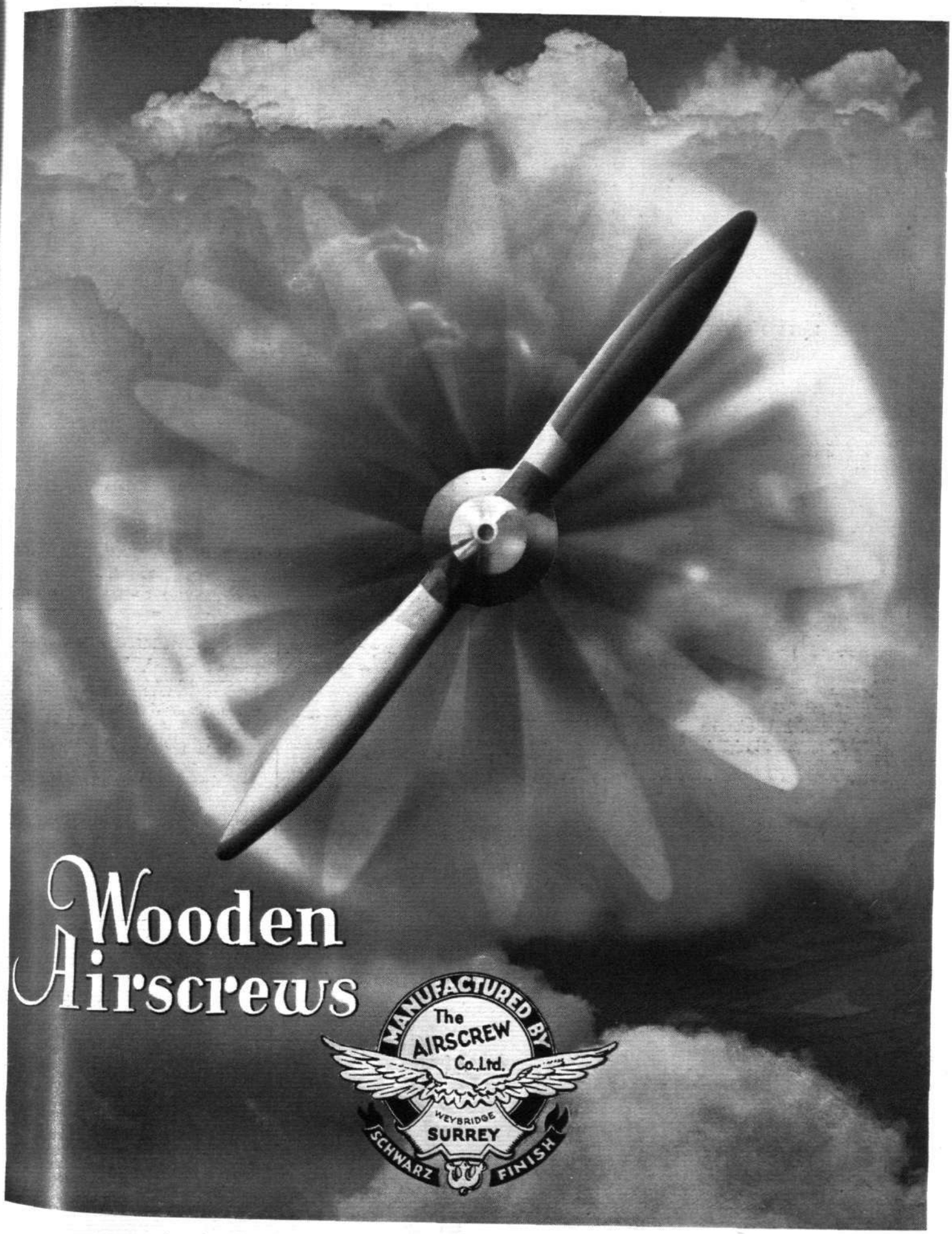
**By A. G. D. Clease, B.Sc.**

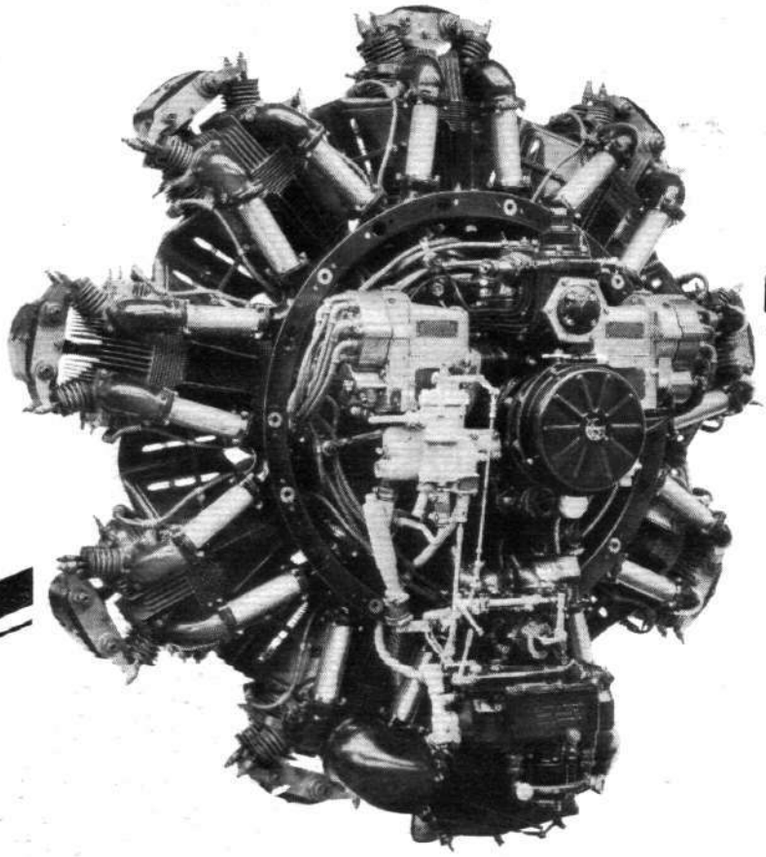
*(Reprinted from "THE AUTOCAR")*

THIS Booklet will prove of the greatest value to all beginners who want to know how the various units of the car work. Every part of the engine and chassis is adequately dealt with, and a chapter on the electrical lighting and starting system is included.

**Price 1/- net. By post 1/2**

*From leading booksellers or direct from the Publishers,*
ILIFFE & SONS LTD.,
Dorset House, Stamford Street, London, S.E.1.


Wooden
Airscrews
MANUFACTURED BY
The
AIRSCREW
Co. Ltd.
WEYBRIDGE
SURREY
SCHWARZ FINISH



"Bristol"

# PEGASUS IV AIRCOOLED ENGINE

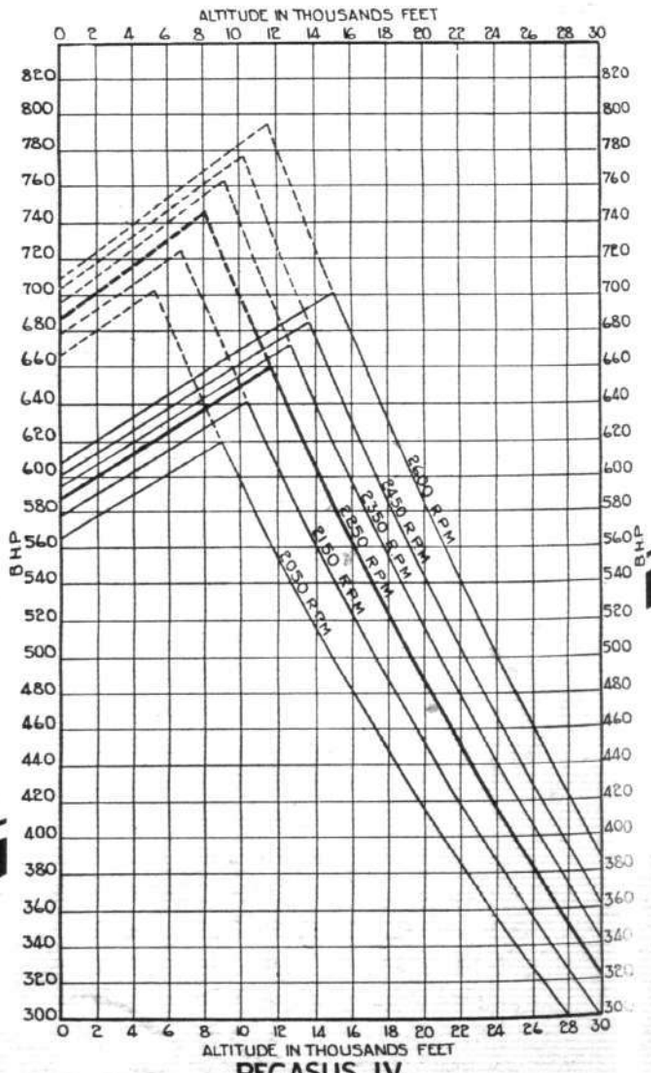
is the high supercharge member of the Pegasus family, which, although larger in diameter and heavier than the corresponding Mercury type, has a substantially greater power output making it particularly suitable for aircraft such as single and multi-engined bombers operating at altitudes of 15,000 feet upwards. The engine maintains normal pressure in the induction system up to 15,000 feet at maximum r.p.m., and is designed to operate on service fuel of 87 minimum octane value.

## PEGASUS IV ENGINE.

The design of this engine has been carefully considered from the aspect of adequate cooling on the climb when installed with a ring cowling, and extended flight tests have been made at moderate climbing speed with entirely satisfactory results.

## PERFORMANCE DATA.

| | |
|---|---|
| Normal Engine r.p.m.... ... | 2,250 |
| Maximum Engine r.p.m. ... | 2,600 |
| B.H.P. for take-off at Sea-Level at normal r.p.m. ... ... | 675/700 |
| Rated Output at normal r.p.m. | 640/670 at 11,500 feet |
| B.H.P. at maximum r.p.m. | ...680/710 at 15,000 feet |
| Fuel Specification ... ... | D.T.D.230 |
| Minimum octane value ... | 87 |




PEGASUS IV.
POWER AT ALTITUDE.

STANDARD TEMPERATURE & PRESSURE CONDITIONS - FUEL 87 OCTANE
- - - - MAXIMUM POWER AVAILABLE FOR TAKE OFF & CLIMB
——— POWER AVAILABLE WHEN RATED BOOST IS NOT EXCEEDED

*Designed and Manufactured by*
THE BRISTOL AEROPLANE CO., LTD.,
FILTON, BRISTOL.

*Telegrams: "Aviation, Bristol."*
*Telephone: Bristol 45051.*

Printed in England for the Proprietors and Publishers, FLIGHT PUBLISHING COMPANY LIMITED, Dorset House, Stamford Street, London, S.E.1, by THE CORNWALL PRESS LTD., 1-6, Paris Garden, Stamford Street, London, S.E.1. "Flight" can be obtained abroad from the following: FRANCE: W. H. Smith & Son, 248, Rue Rivoli, Paris; Hachette et Cie, Rue Reaumur, Paris, and branches. BELGIUM: W. H. Smith & Son, 71-75, Boulevard Adolphe Max, Brussels. AUSTRALIA: Gordon & Gotch, Ltd., Melbourne (Victoria), Sydney (N.S.W.), Brisbane (Queensland), Adelaide (S.A.), Perth (W.A.), and Launceston (Tasmania). NEW ZEALAND: Gordon & Gotch, Ltd., Wellington, Auckland, Christchurch and Dunedin. INDIA: A H Wheeler & Co., Bombay, Allahabad and Calcutta. CANADA: Imperial News Co., Toronto, Winnipeg and Vancouver; Benjamin News Co., Montreal; Gordon & Gotch, Ltd., Toronto. SOUTH AFRICA: Central News Agency, Ltd. UNITED STATES: The International News Co., New York. Entered at New York Post Office as second-class matter.